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Rail-Road News.

Hoosic Mountain Tunnel.

This stupendous project contemplates the perforation of the Hoosic Mountain, near North Adams, Mass., for the passage of the trains of the Troy and Boston Railroad. The length of the proposed tunnel is 24,100 feet, or about four miles and three quarters, and the estimated cost $1,948,257. Such is the configuration of the mountain, that it is said no shafts can be sunk less than eight hundred feet in depth. Consequently, it will only be possible to work at two points simultaneously, and on this supposition, it is calculated that one thousand five hundred and fifty-six days, or more than four years, will be necessary for the completion of the undertaking.

The Massachusetts Senate have passed a law which is now before the House, to loan to the Troy and Boston Railroad Company, $2,000,000 of State bonds, on condition that certain amounts of money shall be expended by the company previous to the advance of the several instalments of the loan from time to time, which expenditures are to exceed the amount of said advances, until the entire railroad, with the exception of the tunnel, shall be completed; but on this event, the entire amount of stock loaned is to be advanced to the company.

[We are afraid that the cost of such a work would be so great that it never would pay the expenses.

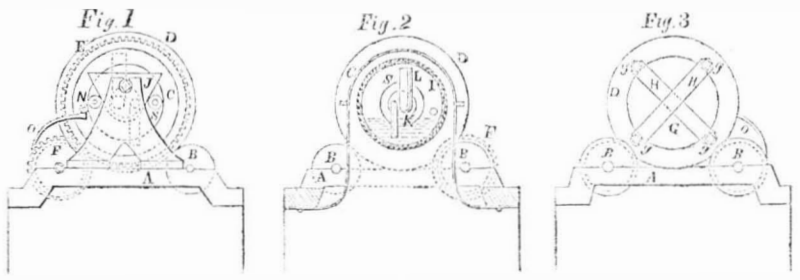
NEW YORK AND ERIE RAILROAD.—The first train passed over this important public work on Tuesday, last week, from Piermont to Dunkirk, its entire length of 395 miles.

James Watt.

While in retirement in the decline of life, he did not allow his faculties to slumber, and was jealous of any decline in his mental capacity. "At one time (says M. Arago) our associate imagined that his faculties were declining, and in keeping with the seal he had adopted (an eye surrounded with the word 'observare') he determined to satisfy his doubts by making observations on himself, and accordingly when upwards of seventy years of age, he determined to select some kind of study on which he might try his powers, and for a time he was in despair, because he could find no subject that was new to him. At length he thought upon the Anglo Saxon tongue, which is a very difficult tongue; and immediately it became the subject of the desired experiment, when the facility with which he mastered it soon convinced him that there was no ground for his apprehensions." He thus busied himself in various useful and entertaining pursuits till near the end of his lamented death in 1819.

There is project on foot for the establish ment of a city railroad from 128th street to the Battery, through the Second Avenue.

ANDERSON'S REVOLVING STEAM BOILER.



The accompanying engravings represent an invention in steam boilers by Mr. Charles Anderson, of Warren, Warren Co., Pa., and for which he has taken measures to secure a patent.

Fig. 1 is a front end view of the revolving steam boiler. Fig. 2 a transverse section. Fig. 3 a back end view, and figure 4 is a longitudinal vertical section

The same letters of reference indicate like parts.

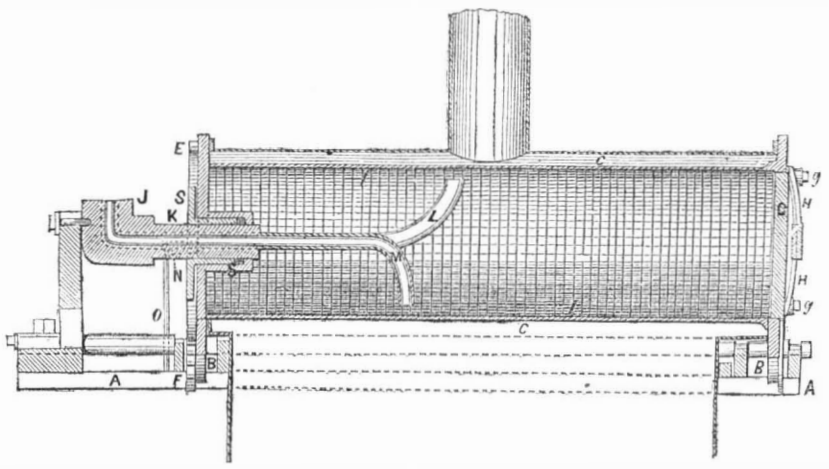
There are three specified improvements connected with this invention. One is a mode of preventing explosions by securing either the head or end of the boiler by springs which will bear a certain pressure, but when the pressure exceeds this, the end will be thrust out, and prevent the boiler from bursting to pieces.

The second improvement applicable to revolving boilers is applying a cylinder of wire gauze in the interior of the boiler for the purpose of gathering up the water on the surface, when the boiler is rotating.

The third improvement is the placing of an alarm valve on the boiler, to be opened once during every revolution by the striking of a stationary bar or other object placed in a convenient position to call the attention of the engineer to the boiler.

A is a strong metal frame supported above the furnace and carrying friction rollers, B B. C is the shell of the boiler, having a strong circular flange, D, at each end resting on the friction rollers. The front end of the boiler has a toothed wheel, E, on it, gearing into a pinion, F, which receives motion from any power, and thus gives a rotary motion to the boiler. G is the back end of the boiler, and is fitted steam tight in the shell of the boiler. H H are two bar springs pressing across it, and secured by the bolts, *g*, fitted into the flange, D. The ends of the springs are formed and fitted under the heads of the bolts in such a way as to be released by any great pressure on the end, G. These springs are made and adjusted to sustain a given amount of pressure on the end of the boiler; should the pressure of steam increase beyond the tension of these springs on the boiler, the end, G, will be thrust out, and the bursting of the boiler will be prevented.

Figure 4.



In figs. 2 and 4, I is an interior lining of fine wire gauze or copper, for the purpose mentioned above. J is a stationary head secured at any convenient distance from the front end of the boiler with a cylindrical neck, K, attached to it, passing through a stuffing box, S, into the boiler, concentric to its axis of motion. In this head, J, and through the neck, K, there are two passages leading into the boiler communicating with a pipe, L, turned upwards. This is the steam pipe, and there is another one, M, turned downwards, which is the feed pipe. N is an alarm valve or guage placed on the front end of the boiler; O is an arm standing up from the frame. Its upper end is in such a position and its point inclined, so that the escape or alarm valve, N, shall strike it once during every revolution of the boiler, so as to open and let out a small jet. If the water is too low, steam will come out, if not, water will come out, and thus it will be an *indicator alarm*. The boiler is to have the flues running under and around it in any desirable manner, and it is intended to have only ½ of it containing water. As the boiler revolves, the water is thrown upon the sides of the boiler and also upon the wire work. A large and continually changing heating surface, the inventor states, is always presented, so as to raise a great quantity of steam with the least quantity of fuel in a given time. A smaller boiler is required and a reduction of space for boiler and fuel room is thus obtained. The back end may be so guarded against, that if it should be blown out, little damage will be the result.

More information may be obtained by letter addressed to Mr. Anderson.

The Philadelphia Navy-Yard.

Preparations are about to be made for removing the big ship house, under which the ship-of-the-line Pennsylvania and the steamships Mississippi and Susquehanna were built, to a point nearer the river. In its present position it is perfectly useless, being more than 300 feet from the end of the new piers. It is to be moved about 200 feet, and placed upon the foundations already prepared. This will be an extraordinary feat, as the house is about 280 feet long and 100 feet wide, and probably weighs 700 tons. The enormous shears are to be immediately moved to the extremity of the pier, between the two houses, so as to be used in lightening the ship-of-the-line North Carolina, shortly expected there to be taken out on the sectional dock. The visit of this ship to that station will be quite an event in its history, as she was built within the Navy Yard, and launched in 1820, at which time neither of the ship houses had been constructed. Her keel was laid west of the present site of the frigate house, her bow extending near to the spot now occupied by the joiner-shop, which is not less than 700 feet from the extremity of the piers. The North Carolina when hauled on the ways, will be close alongside of the spot where her keel was originally laid, thirty odd years ago. It is thought that she will be rebuilt or require extensive repairs, as it has been many years since she was overhauled.

Metals of the United States.

Iron is the most abundant metallic mineral our country affords. Its value is ten times that of gold and silver, and one-half the value of all the metals produced in the United States. Iron is found in every State of the Union.

The most valuable mine is one in Salisbury, Ct., which yields 3,000 tons annually. The mines in Duchess and Columbia counties, in the State of New York, produce 20,000 tons of ore; Essex county, 1,500 tons; Clinton, 3,000; Franklin, 600; St. Lawrence, 2,000; amounting in all, to more than $500,000. The value of the iron produced in the United States, in 1835, was $5,000,000; in 1837, $7,700,000.

In Ohio, 1,200 square miles are underlaid with iron. A region explored in 1838 would furnish iron sixty-one miles long and six miles wide; a square would yield 3,000,000 tons of pig iron; so that this district would contain 1,000,000,000 tons. By taking from this region 400,000 tons annually (a larger quantity than England produced previous to 1829,) it would last 2,700 years—as long a distance, certainly, as any man looks ahead! In the states of Kentucky and Tennessee, 100,000 tons are annually manufactured.

The most extensive lead mines in the world are in Missouri, where the lead region is seventy miles long by fifty wide. These mines in 1826, produced 7,500,000 tons, and the whole produce of the United States was 8,322,105.

The quantity of lead manufactured in the United States, in 1828, was 12,311,730 lbs.; in 1829, 14,541,310 pounds; in 1838, 8,332,-105; and in 1832, 4,281,867.

The copper trade, until within a year or two, has not been of much importance, as the result of the efforts made were not such as to justify any great operations. But now it appears to be attracting a good deal of attention. Whether the demand of the copper stock is a fair index to the value of the copper regions remains to be seen.

The Everglades.

Gov. Brown has recently made a tour through Southern Florida. He took occasion to examine, with some attention, the Everglades, with reference to their drainage. His opinion is that thorough drainage is impracticable. If it could be effected, the deposits laid bare would be found to be purely vegetable decomposition, light enough, when dry, to be blown away, and quite as combustible as peat The waters of the Everglades, says the Tallahassee Sentinel, teem with fish of many varieties, and in such numbers that one must see to believe. With a single spear the fisherman may load his boat in a few moments. Wild fowl are there in such enormous flocks, as almost to darken the sun, and game is abundant on the islands.

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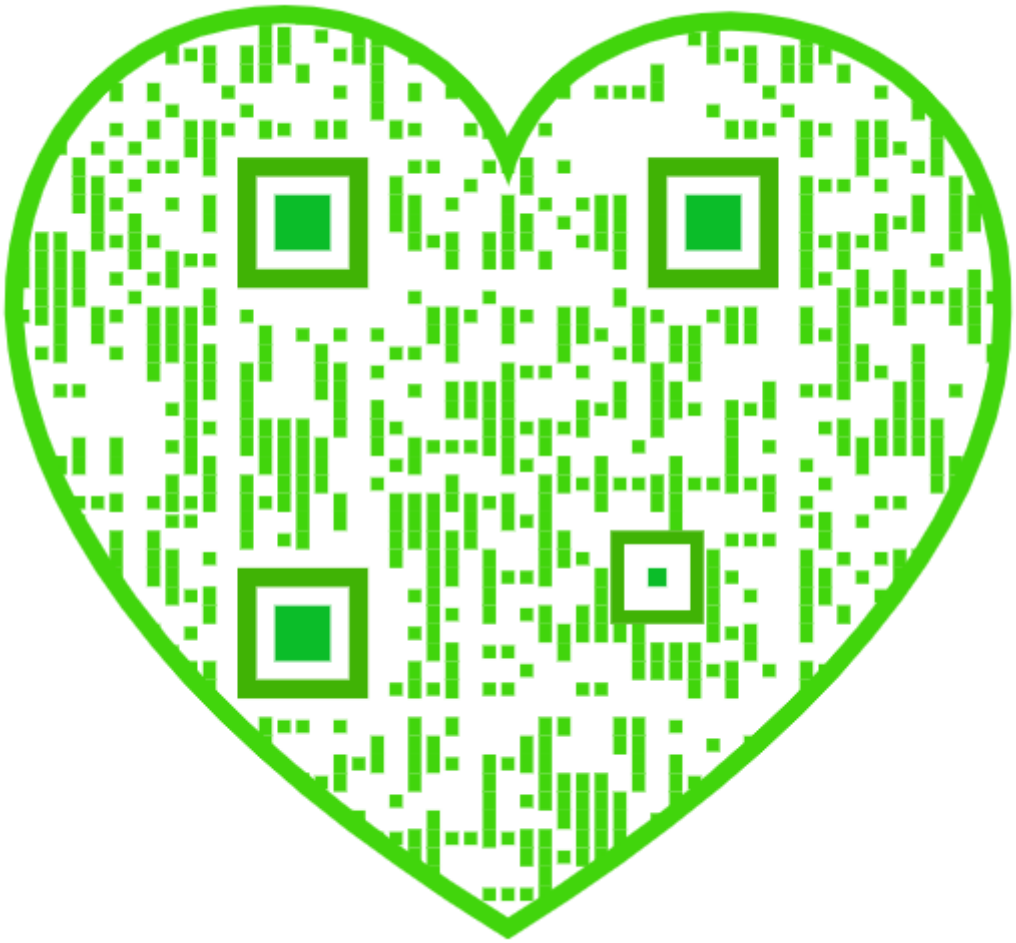

Miscellaneous.

Foreign Correspondence.

LONDON, April 18th, 1851.

On the 14th inst., the foreign commissioners of the exhibition were received at Buckingham Palace, by Prince Albert. The Commissioner General of France, M. Sallanorouse de Lamornaix was deputed by his coadjutors to express to his Royal Highness the sentiments of the Governments represented by those gentlemen. This he did in a terse and succinct address, thanking his Royal Highness, on the part of the Foreign Commissioners, for his gracious reception of them, and for taking the lead in the formation of a grand exhibition of the products of industry of the whole world. "The assembling together the results of the inventive and executive faculties of mankind in one spot, where, nevertheless, sufficient individuality would be preserved to exhibit the nationality of each, was a high philosophic idea, demonstrating depth of thought and practical consideration for the welfare of the manufacturing world, worthy of a great mind. In a political point of view, it was calculated to exercise the most beneficial influence, by increasing the intimate connections between nations and individuals, from whence the most beneficial results might be anticipated, while the manner in which this idea had been carried into execution reflected equal honor on those engaged on it, and on the country possessing the resources which had been called into action. For this, the world was indebted to his Royal Highness the Prince, and to her Majesty who had been pleased to accord her assent and assistance towards its execution. Thanks to this illustrious influence, the era of barbarous wars might be considered as terminated; but new lists for combat were offered to the world, in the struggle of progress and civilization, to overturn by their overwhelming moral force the remains of former antipathies and prejudices."

His Royal Highness listened with attention to their simple but energetic expressions of respect, and replied that he received with much pleasure the spontaneous exhibition of good feeling on the part of Foreign Commissioners; he was much gratified to observe the alacrity and zeal of every country in contributing to the interest of the universal Exhibition, which, from what he had already seen, would, he had no doubt, prove fully worthy of the contributors, and would enhance the reputation of the countries contributing.

The Earl of Granville then presented the Foreign Commissioners severally to his Royal Highness, who addressed a few remarks to each, on the nature of the contributions of the countries represented by them, and the deputation withdrew, much gratified by their reception.

This meeting was what I call "something of a sensible affair." None of your buskined, buckram, jewelled fal-de-rals, but a plain common sense levee, and the sentiments expressed exhibited the right true spirit. It is time that our mechanics stood in their proper boots. This World's Exhibition will do a great deal for their elevation. The mechanics are now beginning to exert a proper influence in Europe. Without their inventions, England would be a poor country indeed. It is time that they were recognized as the equals of men of literature, law, the fine arts, war, &c. Their works at the great Exhibition will proclaim their abilities.

There can be no question of the mighty pageant which will be exhibited in Hyde Park before this appears in the columns of the Scientific American. No less than 7,000 season tickets have been sold already, and the cry is "still they come." To-morrow (19th), is the last day for the reception of goods, and to-day there has been a rushing and a racing worthy of Bartholomew Fair,—and on the first day of May, Victoria, the Island Queen, attended by her nobles, will open the great Exhibition in state. It will be the grandest display witnessed in two thousand years. Our countrymen now here or who may be here at that time, may consider themselves lucky.

Our American exhibitors are "going ahead" with their decorations in true national style, and will make up for the backwardness caused by the dispute about Mr. Stansbury.

The Prince of Wales yacht, belonging to the Greenwich Hospital Schools, is now fitting at Woolwich, and will be ready in the course of a fortnight, when she will be removed to the Serpentine water, in Hyde Park, there to remain during the great Exhibition for the inspection of visitors. This vessel is about 25 tons register, ship-rigged, and fitted as a man-of-war, and will be commanded by Lieutenant Rouse, R. N. Her crew will consist of twenty boys from the schools at Greenwich, and at times she will undergo various evolutions in naval tactics.

The members of Lloyd's have passed the following resolution:—"That during the period when the Industrial Exhibition is open, any foreign visitor presenting a recommendatory certificate from a British Minister, Consul, Vice-Consul, or an agent to Lloyd's, shall have admission to the merchants' room during the hours of business, viz., 9 A. M. to 6 P. M." As foreign visitors will thus be afforded the opportunity of gratuitously perusing the various newspapers of their respective countries, which are received by every mail at Lloyd's, it may be well to have their attention drawn to the easily obtained recommendation which will entitle them to the privilege to be derived by this act of liberality on the part of the members at Lloyd's.

More space is requested for many fancy articles of design, which were prevented from being entered in season, owing to the tardy action of Parliament in passing the new act for the protection of designs.

A new description of fuel for steam purposes, called consolidated coke, has been introduced to the Admiralty, the owners claiming for it superior properties for generating steam, and maintaining the necessary heat with less destruction to fire-bars, &c. The Admiralty have entertained the application of the projectors, and have ordered the authorities at Woolwich to report upon the qualities and applicability of the fuel.

A new article, in the shape of a vest, with water-tight double lining, has just been exhibited by a man on the Thames. It was inflated, and served as an excellent life-preserver. I think it is an excellent idea, and should be happy to hear of its being adopted in America, where it is so often required.

EXCELSIOR.

Astronomical Science.

At a meeting of the French Assembly on the 25th of March, a vote was passed, with only six dissentients, appropriating $18,000 for mounting equatorially the large telescope at the astronomical observatory at Paris. The appropriation was recommended by a committee of fifteen, of which the astronomers MM. Arago and Leverrier were members. The report which was a very able one, was drawn up by M. Arago, and in it he notices the most remarkable instruments in Europe, and the nations and societies which are striving with the most commendable zeal in making astronomical discoveries. In the course of the report he pays the following compliment to this country:

"The United States of America, which have hitherto appeared to take no interest in the progress of nautical astronomy exclusively, have started of late upon a broader path with great ardor, and if their efforts continue, the day is not far distant when they will occupy a place in the first rank. Already they possess three magnificent observatories—one in Cincinnati, the Second at Washington, and the third at Cambridge."

In speaking of the most noted instruments yet constructed, he says: "If we except the observatory of Pulkowa, and that of Cambridge, in America, there are nowhere found object-glasses of more than 32 centimetres (12,598656 inches English) in diameter. The Bureau of Longitude has taken advantage of a favorable opportunity, and purchased with its ordinary funds an object-glass of 20 centimetres in diameter, for the very moderate sum of 28,000 francs, ($4,812,50. This object-glass, the good quality of which has been ascertained, is the production of M. Lerebours, and is flint-glass and crown-glass manufactured in the French factories. We have every reason to believe that it will bear a magnifying power of from two to three thousand times; that is to say, three hundred times superior to that of the instrument used by Galileo for the discoveries which have been so much and so justly celebrated."

However great the despatch may be which may be used, M. Arago declares that the mounting of this instrument cannot be completed till some time next year.

New Machine Shop at the Brooklyn Navy Yard.

There is a splendid new machine shop in the course of erection at the Brooklyn Navy Yard. It will contain, amidst other apparatus, mills for rolling copper, with steam and trip-hammers and slotting-machine. The building is three hundred feet long by sixty-four feet wide, with walls twenty-eight inches thick. At it highest central elevation it will contain three stories. It is intended to be covered with a copper roof, supported at equal distances of five feet on either side, by light stays of a peculiar construction, resting on iron braces one and a quarter inches diameter. The rafters are composed severally of two long plates of iron, running parallel. The new roof already extends over the engine-house, presenting with its burnished surface and light supports, an elegant appearance. The elevation from the apex is fifteen feet. The dimensions of the compartment are sixty four by fifty feet. This engine-house is probably the most complete of the kind in America. Two elegant tiers of iron arches in the gothic style rise on either side of a central passage to the roof, where they are mounted by ornamental entablatures running transversely from side to side. The floor is of cast iron covered with star work; and the visitor sees from the large open space on which he stands the engine on an elevated platform. It is an engine of 400-horse power, 240 of which applied to the emptying of the adjoining dry-dock will exhaust it in two hours. The diameter of the piston is fifty inches, with 12 feet stroke. The working beam is a solid cast, and weighs 15 tons. The diameter of the fly-wheel is 25 feet. The pistons of the two pumps, connected with the dock by descent into a well sixty feet deep, have eight feet stroke. This well is encased with metallic plates, fastened by copper bolts, and descends five feet below the level of the dock.

Steam Pleasure Yacht.

We learn by the Philadelphia Ledger that a clipper propeller yacht is now building in Philadelphia, for Capt. R. F. Loper, (the well known inventor), for a pleasure yacht. It is 82 feet keel and 92 feet over all, 16 feet beam and 11 feet deep. Her power is to be supplied by two beautiful low pressure direct action engines of Loper's patent, with cylinders of 18 inches diameter and 14 inches stroke, in progress at the Penn Works of Messrs. Reaney, Neafie & Co. Her boiler is on a new plan perfected by J. B. Bloodgood, Esq., of that city, which is believed to possess many advantages over the usual form of tubular boilers.

This yacht is to be named the Col. John Stevens, to commemorate the valuable aid afforded by that distinguished man, during his long and useful life, in bringing railroad and steamboat travelling to its present perfection. The late Col. Stevens (the father of the Messrs. R. L. E. A. & Jno. Stevens) was engaged as early as 1803, at his country seat at Hoboken, in experimenting with a submerged wheel for steamboats, and only abandoned his idea on becoming connected with the celebrated Robert Fulton in adopting the paddle-wheel for river navigation, it not being contemplated at that time that steam could be adapted to traversing the ocean.

Col. Stevens also made the prediction, long since verified, that by crossing Jersey by railroads, (then unknown in any part of the world) and the use of the steamboats for the rivers, the travellers between the two cities might breakfast in Philadelphia, dine in New York, and return again in time to sup at the point of starting, all in the same day. The yacht is to be propelled by the original Stevens' scull, with the Loper improvements, which is most appropriate to his vessel, named in honor of the inventor of the first submerged wheel. Her rig is to be that of a pilot boat with three masts, and all concerned in her construction have determined to render her a perfect "skimmer of the seas." She is to have a trunk cabin, replete with every comfort and convenience.

This is the first American steam yacht, and we throw up our cap to Capt. Loper.

Singular and Startling Phenomenon.

A scientific gentleman of this city—whose name at this time we are not permitted to make public, without a breach of confidence—has within the last six weeks, at various times produced animal life solely from action of certain chemical preparations on each other, in such a manner as leads him to the conclusion that a more perfectly developed process, aided by further scientific discoveries, will produce results miraculously astounding to the world! The specimen of life produced as above, did not exist more than twenty-four hours in either instance; but the simple fact of life power being thus manifested and attested, as it is by the personal examination of five or six eminent physicians, may lead to something of which the world of science, as at present, may look forward with awe and amazement!"—Cincinnatti Nonpareil.

[A very startling phenomenon no doubt, but qualified, we perceive, with the necessity of "further scientific discoveries," to produce the wonderful results anticipated.

Rivers of Alabama.

The rivers of Alabama present a highly interesting and important feature in its physical geography, and their improvement has been the subject of a report by Professor Toumey to Gov. Collier. The Alabama is navigable to Wetumpka, a distance, from Mobile, by the windings of the river, of 386 miles, and the Warrior, for more than half the year, is navigable to Tuskaloosa, a distance of 356 miles. The Tombeckbee is navigable to Aberdeen, in Mississippi, 460 miles. The navigable character of these streams is due, in a great measure, to what at first sight appears a defect—their tortuous meanderings, which, while they increase the length of the rivers, diminish their velocity.

Force of Waves.

It is difficult to conceive of the immense force which is exerted by the waves of the sea, when driven on by a strong wind. The late catastrophe at Minot's Rock, gives us some idea of this tremendous power, and shows us how feeble are the strong works of man when opposed to the fury of this element. At the last meeting of the British Association, Thomas Stevenson, civil engineer, gave the results of his observations on the force of the waves, made by means of the marine dynometer.

The greatest result registered in the Atlantic Ocean, was at Skerryvore Lighthouse, during a westerly gale of the 29th of March, 1845, when the force was 6,093 lbs. or three tons per square foot. The greatest result registered in the German Ocean was 3,013 lbs. or about one and a half tons per square foot. On the 20th of November 1827, in a heavy ground swell after a storm, solid water rose at the Bell Rock Lighthouse 106 feet above the level of the sea, irrespective of the depth of the trough of the wave. Such an elevation is due to a head of water of the same height. The force then, which urges the lower courses of Bell Rock must have been nearly three tons the square foot, a force which, when exerted upon a large extent of surface, becomes almost inconceivably great.

THE AMERICAN PORPOISE A NEW SPECIES.—Professor Agassiz has determined that the common porpoise of our waters, which has generally been regarded as identical with the Phocoena Communis of Europe, is a distinct species, and hitherto undescribed. Professor Agassiz proposes as a name for this new species, that of Phocoena Americana.

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New Steamship Humboldt.

This fine new ship, the consort of the Franklin, made her trial trip on Wednesday last week.

The interior of this vessel is remarkable for its simplicity; but, though plain, it is not wanting in elegance, and possesses for passengers and crew every essential comfort. The dining saloon runs aft to the stern lights, and is adorned with costly paintings, burnt in enamel. The state rooms, arranged in the saloon below, haveexcellent ventilation and are well lighted. The shafts of the engines work below the main deck, and the operation of all the machinery may be surveyed from the upper gallery of the engine room.

Her style of construction and her dimensions may be obtained from the following: length on deck, 290 feet; of keel, 283 feet; breadth of beam, 40 feet; depth 27 feet; registered tonnage, 2,200 tons. In place of the usual curved bow, her's is perfectly straight, and thus affords 6 feet additional breadth of deck room. The body of the vessel is of live oak, and by an adaptation of double floors, no butts or joints are visible below the engine and boilers. Her frames and timbers are secured by iron and copper bolts. The Humboldt is rigged with three masts and has no bowsprit. The cylinders of her two side lever marine engines are 95 inches diameter, with pistons of 9 feet stroke; diameter of wheels 35 feet; shaft 21 inches. She has four of Miller's patent boilers, each 11 feet diameter by 27 feet 6 inches in length, and containing 32 furnaces.

She went out past the Light ship and returned about 4 P. M. We like her hull, she is sharp and of a graceful model. Her builders are Messrs. Westervelt and Mackay. Her engines were built at the Novelty Works by Messrs. Stillman & Allen.

The Earth's Motion made Visible.

We have seen accounts, in foreign papers, and many extracts in papers at home, stating that there was an experiment now going on in Paris, whereby *the diurnal motion of the earth* was rendered palpable to the senses. It is thus described :—

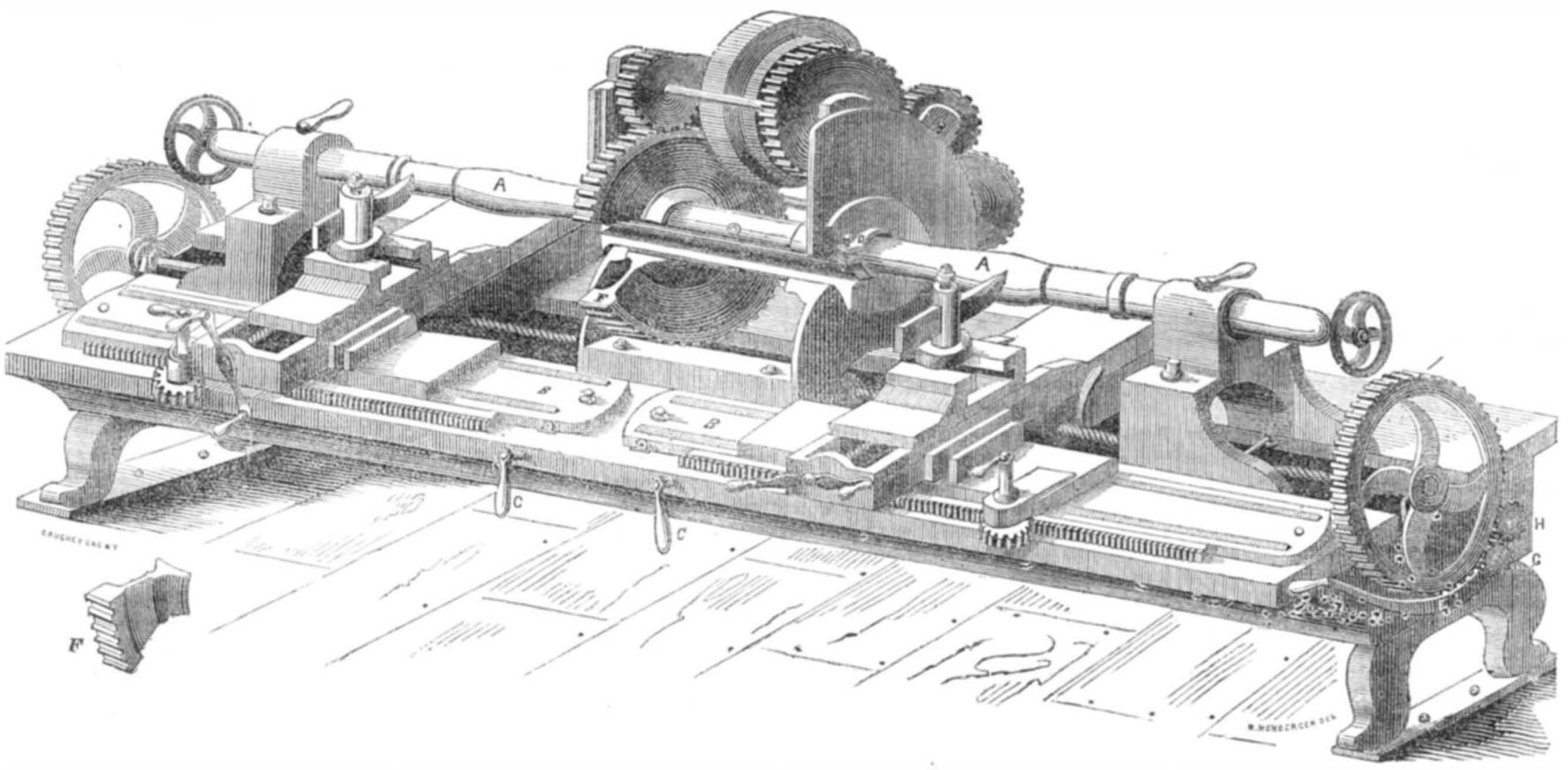
"At the centre of the dome of the Pantheon a fine wire is attached, from which a sphere of metal, four or five inches in diameter, is suspended so as to hang near the floor of the building. This apparatus is put in vibration after the manner of a pendulum. Under and concentrical with it is placed a circular table, some twenty feet in diameter, the circumference of which is divided into degrees, minutes, &c., and the divisions numbered. Now it can be shown by the most elementary principles of mechanics that, supposing the earth to have the diurnal motion upon its axis which is imputed to it, and which explains the phenomena of day and night, &c., the plane in which this pendulum vibrates will not be affected by this diurnal motion, but will maintain strictly the same direction during twenty-four hours. In this interval, however, the table over which the pendulum is suspended will continually change its position in virtue of the diurnal motion, so as to make a complete revolution round its centre. Since then the table thus revolves, and the pendulum which vibrates over it does not revolve, the consequence is, that a line traced upon the table by a point projecting from the bottom of the ball will change its direction relatively to the table from minute to minute, andfrom hour to hour, so that if such point were a pencil and that paper were spread upon the table, the course formed by this pencil during the 24 hours would form a system of lines radiating from the centre of the table, and the two lines formed after the interval of one hour would always form an angle with each other of 15°, being the 24th part of the circumference."

If any person by this experiment can be impressed with either seeing or feeling the earth in motion, it is strange to us, and so it will be to any person acquainted with astronomy or horology.

Manufacture of Precious Gems.

M. Ebelmen, the very distinguished mineralogist, director of the national porcelain manufactory of Sevres, France, has succeeded in producing crystalized minerals, resembling very closely those produced by nature; chiefly precious and rare stones employed by jewellers. To obtain this result, he has dissolved in boric acid of alum, zinc, magnesia oxides of iron, and chrome, and then subjecting the solution to evaporation during three days, he has obtained crystals of a mineral substance, equalling in hardness, and in clearness and in beauty of color, the natural stones. With chrome, M. E. has made most brilliant rubies, from two to three millimetres in length and about as thick as a grain of corn. This gentlemen, the successor at Sevres of the illustrious Brogniart, has already connected his name with some remarkable improvements which have lately distinguished famous establishments, and he is universally designated for the vacant place soon to be filled in the Academy of Sciences, section of mineralogy.

WHITE'S LATHE FOR TURNING TAPERS AND CAR AXLES'



This improved Lathe is the invention of Mr. J. D. White, of Hartford, Conn., and was secured to him by patent on the 21st of May, last year.

A small perspective and a transverse section of this lathe were illustrated and described on page 121, Vol. 4, Sci. Am., before the patent was secured. Some improvements have been made in the details since that time, and one has been in operation for the past year in the establishment of Tracy & Fales, Hartford, gentlemen of enterprise and probity who have, during that period, turned off over 2,000 axles on it, and have not spent a single dollar on it for repairs. They state that it saves the labor of one man, and saves one lathe in turning axles. Mr. Hovey, their foreman, states that one man turns off six axles per day with it, and he considers it to be the best lathe for axles ever constructed.

The accompanying engraving is a perspective view, showing an axle placed in the lathe. A A is the axle. It will be observed that the chuck is in the middle and double, and that the two ends of the axle are acted on at the same time, for there are two slides and two cutters. The chuck gear wheel has a slot cut in it, and the chuck is constructed with slots in the centre heads, so that a heavy axle can be placed in and taken out with great facility. F is a section of the large gear wheel on the chuck, to fit into the slot so as to drive the chuck by one pinion above, but this section is not absolutely required, as a compensation pinion is placed behind the direct driving one. The principle feature of this invention consists in moveable ways, which can be and are set to any angle so as to guide the cutting tool or tools (one or two) to turn any desired taper on the axle, or to turn it perfectly in line, as may be necessary. B B are the movable ways and the slides with the two tool stocks slide on them. These *ways* are guides for the tools by directing the *slides*. These ways are secured, each on a vertical axis at one end, and at the opposite end, B, it is moved in and out, and thus it can be set to guide the slide with the tool to form any angle with the axle in the lathe. C C, are handles of setting screws to move the ends of the *ways* in and out to any desired point. There are stops on the table of the lathe near the ends of the ways, to hold them at any part on the width of the table. The screws on the ends of the ways are to fasten them down. The lathe is fed by the apparatus and gearing common to all lathes. The large gear wheel at each end feeds by a screw in the common way, and H G are pinions fixed on a swinging lever, E, to gear the feed direct, and for the reversing motion. The bands and pulleys are not shown, as they are down below and behind the lathe. The tool stocks have reversing pinions, to move the slides rapidly back by hand. The cutters can be set near to or distant from the axle by the setting screws shown, so as to cut large or fine chips. It will be observed that while one cutter is turning the taper at one end, the attendant can be squaring up his journal, which requires his attention, at the other. The dog, D, catches into the chuck head to carry round the axle. A screw bolt can be and is set through the tube of the chuck to retain the axle firmly and prevent it from springing at the centre, when the cutter is making large chips. The centres of this lathe are always in line, and are never required to be set off, thus the centres are preserved *true* under all circumstances. A taper of any degree can be turned, and by using a card of reference, a taper of a certain degree may be turned today, and in a year hence, by reference to the card, the same taper may be cut to a diamond shaving, by setting the way in a moment to the indicated point. The principle of the movable guide ways is as applicable to a single as a double lathe, and its convenience and utility are self-evident, for it is as well adapted to parallel turning as to taper turning. It is singularly adapted to chucking, and the facility with which work can be chucked by it is one of its essential qualities.

Mr. White is now having small single lathes made, embracing the taperingprinciple, which are better adapted to all kinds of chucking, turning, screw cutting, and general job work than any other kind of lathes. The centres always remain in a direct line, which prevents the wearing of the work at the centre, as is usually the case when the centre in the tail stock, in common lathes, is set off to turn a taper. The way is set by an index and pointer, and the tool moves as guided to any angle along the whole *way*. By having a card on which are noted the number of degrees required to fit the drill socks, drill, centres and tapers that are used in machine establishlishments, the way can be set at any future time to the required angle noted on the card.

The large lathe weighs 4,000 lbs., and costs $600. A small lathe (screw engine) embracing the taper principle weighs about 1500 lbs. and costs $225. A cutting off feed, as an extra, applied to the tool stock, with back rests, for cutting off forged axles, is furnished, if required, at an additional expense of $50.

Mr. White is agent for almost every description of machinery, and will warrant every piece that goes through his hands.

Cholera in Animals.

Evidence was produced to the French Academy, showing that during the prevalence of the cholera in France, horses were observed to be affected with the disease in a like manner with men, and that often, in the case of other epidemics, a common liability of men and horses had been noticed.

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New Inventions.

Railings for Trap Doors.

It is well known that serious accidents very often occur by persons falling through trap-doors, in our stores, into the floor below. Within the past year, if we remember aright, two persons were killed in this city by such accidents. We are glad to know that a remedy, a simple and ingenious one, has been provided by a guard railing, invented by Messrs. Laing & Knott, of Baltimore, Md. Two sides of the railing are secured on the under side of one of the trap folds near the hinges, so that when one fold is raised up, the railing stands up on two sides, close to the hatchway; the other half is secured and formed in the same way, so that when the two folds are raised up, the four sides of the hatchway are surrounded with the railing. One side of the railing can be removed to let down bales, &c., while the other three are left standing. This improvement is a very useful and much needed one, indeed. In all likelihood we shall be able to present engravings of it in the course of a few weeks.

Extracting Silver from Argentiferous Minerals.

We learn through our cotemporary, the London Patent Journal, that Mr. Adolf F. Gurlt, of Manchester, England, has taken out a patent for a new improvement in extracting silver from its ores, which process appears to be different from the one pursued in Mexico. He subjects ores, containing silver, in the state of a sulphuret, directly to the action of a solution of common salt combined with the chloride of zinc or copper. By this means the sulphuret of silver is converted into chloride, which is dissolved in its nascent state by the solution, and it then can be separated by filtration from the mass of the ore. This process is only for the sulphurets of silver. A very strong solution of common salt, along with about 15 parts of chloride of zinc are heated up to 200°, and the ore, in a state of powder, is introduced into it, and kept agitated for about 12 hours, in a barrel for every 500 lbs. of ore. The liquor should be drawn off three times during this operation. After this, by introducing fine pieces of copper or zinc into the solution which has been drawn off, the silver will be precipitated to the bottom of the vessel. The same liquor answers the same purpose over and over again.

Improvement for Arming Steamships.

We see that a Mr. John Scott Russell has taken out a patent, in England, for arming steamers, by placing guns on the platform spaces fore and aft of the paddle boxes. A queer invention this, we think, to grant a patent for. It would not be much worth in this part of the world, and "why should it?" some will ask. Well, it is stated that the guns can be fired in this position inclined towards as well as parallel to the line of the vessel's keel.—Two vessels, on this plan of arming have recently been built in London for the Prussian Government. The vessels are also constructed with a rudder at each end, like some of our ferry-boats. These vessels carry all their heavy weight near the centre.

Improved Revolver.

Mr. C. Jillson, of Worcester, Mass., we are informed, has made an improvement on revolvers, whereby twenty-four charges may be fired for one loading; and it is said to be as compact as Colt's; if it is equal to one of Colt's improved, which we lately saw in the possession of Mr. White, of Hartford, Conn., now at the South as agent for the same, it will be a "biler burster."

Improvements in Knitting Machines.

Mr. Timothy Bailey, of Ballston Spa, Saratoga Co., N. Y., has taken measures to secure a patent for improvements in knitting looms, whereby he applies steam and other power to them, so as to do away with all hand gearing in the knitting loom. Stockings will soon be made much cheaper than is now done, so that the common kinds, like cotton cloth, will soon all be made in the power knitting loom.

Gas Light on Minot's Ledge.

A correspondent of the Boston Transcript has suggested a plan for placing a gas light on Minot's Ledge, which appears to be feasible, and meets with favor. He proposes to erect on the ledge a tubular shaft of the requisite height, to be strongly fastened in the rock, and so constructed as to oppose no unnecessary surface to the winds and waves. This it is designed to connect with gas works on shore, by pipes or feeders; and the distance through which the gas would be necessarily conveyed is said to be of trifling account, as compared with the cost of a structure for a common light. It is urged in behalf of the project, that as the gas could be shut off by day and let on by night at the works on shore, for the greater part of the time, there would be much less of the exposure of life by frequent resort to the ledge.

[This, we think, is a good plan. The gas could be all nearly let off in the morning, allowing only a very small flame during the day. Thus the light would never go out, and it could be kept up at no great expense, without the necessity of going to the lighthouse at all, except once in two weeks, or a month, it may be.

CAPT. BROWN'S STEERING APPARATUS FOR SHIPS.

Figure 1.

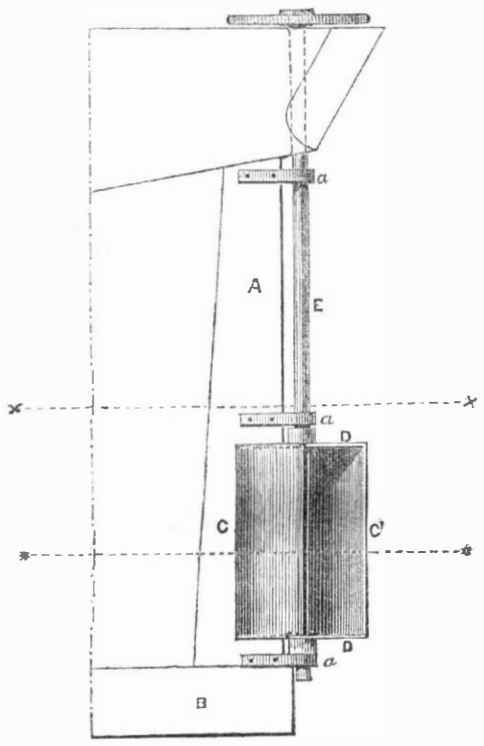
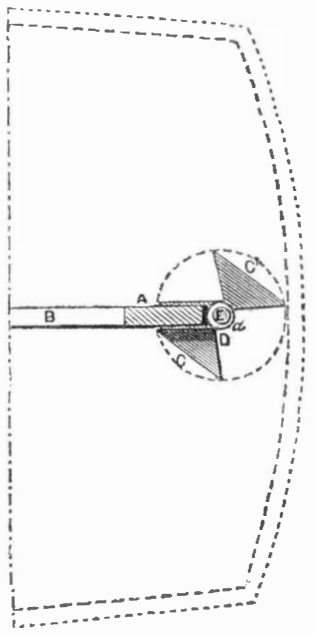


Figure 2.

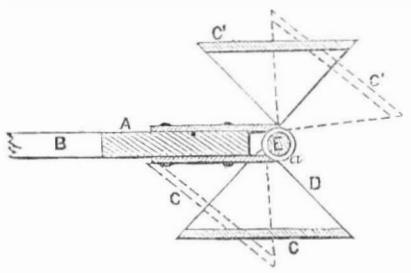


This improvement in Rudders is the invention of Capt. Charles F. Brown, of Warren, Bristol County, Rhode Island, who has taken measures to secure a patent for the same. The invention consists in the employment of two or more rudders hung at a distance apart upon the same stern post and hung in a peculiar manner opposite one another, as represented in the accompanying figures.

Fig. is a side view or part of the stern of a vessel with the rudder attached. Fig. 2 is a plan view taken at the horizontal line, *x x*. Fig. 3 is a section taken at the horizontal line, * *, fig. 1. The same letters refer to like parts.

A is the stern post of the ship. B is the keel. E a rudder post which is proposed to be made of iron or wood. C C are the two rudders each consisting of a flat plate of metal of the given form and size. Wood may be employed, but iron is superior. These rudders are placed parallel to one another, and united at the top and bottom by yokes, D, in which half way between the rudders, there are bosses fitting to the post, E, and firmly secured to the same. The rudder post is hung on the stern post in loops, *a a*, or otherwise.

FIG. 3.



The rudders may have motion communicated to them by any suitable steering apparatus. By referring to the dotted lines, fig. 2, the circle describes the path of the edges of the rudders in turning. As the rudders form chords to the said circle they offer but little resistance to the water when moving from one position to another, as compared with the common rudder, which is the radius of a circle. In fig. 3 the rudders are represented amidship by the right lines, and in dotted lines when the helm is hard a-starboard. The inside face of rudder, C', and the outside face of C, presentan inclined plane to the water, and by their position of resistance, so is the course of the vessel changed and directed. Both rudders being of the same size, at the same angle to the line of the motion of the vessel, and at the same distance from a common axis, the effect of the surface resistance will be the same on each, and will not tend to alter the position of the rudders. It will at once be perceived that the labor of the steersman is reduced almost to a cypher, whereas steering by the common rudder is a work of great labor. When the helm is a-port, the outside face of C, and the inside face of C, act upon the water—rather the water acts upon them. More than two rudders may be used—the claim is not limited to the two, but more would be detrimental instead of being beneficial. The effect intended to be produced by hanging the rudders at a distance from the post at opposite sides, is to make the pressure caused by the resistance of the water—as the vessel is passing through it—on one rudder, balance that on the other and thus enable the steersman to keep it in any position with great facility. The position which the rudders occupy in relation to their motion, though it allows them to offer the same resistance to the progress of the vessel, causes them to meet with but little resistance when moved in steering.

The main parts of this improvement in steering apparatus may be made of composition metal, so as not to be affected easily by corrosion. We believe that this improvement will command attention. It is the production of a very ingenious and experienced nautical gentleman, from whom personally other information may be obtained if desired.

Another Trial of Prof. Page's Electric Locomotive.

Prof. Page, Examiner in the Patent Office, made another experiment with his Electro-Magnetic Locomotive, at Washington, on the afternoon of last Tuesday, the 29th ult.; it made, during one mile, at the rate of 19 miles per hour. Some of the cells broke and prevented a long trial. It ran to Bladensburgh, five miles, in about 39 minutes. No practical data as criterian of expense in the working of this engine, so far as we have learned, have yet been published. According to the mode we have of calculating the expense of working steam and electric batteries, we would make the expense of the latter to exceed the former by a great deal.

The Atmospheric Lamp!---Another New Light from Paine's Laboratory.

The world has heard and said much of H. M. Paine's hydro-magnetic light,—the wonder of the age,—and now, having seen that he can "set the river on fire," it will soon see that he can set the atmosphere on fire also, for his luminosity has recently broken out in a new spot, and Paine's atmospheric light will be counted as great a wonder as his hydro-electric. On Saturday evening, April the 26th 1851, he came into our office, and stated that he had that day succeeded in compounding a liquid, in passing through which, common atmospheric air is catalyzed, or affected, so as to burn with a clear white light, more brilliant than that of oil or camphene, and wished us to remember the time, so as to fix the date and his priority of this great and wonderful invention. We have since seen his atmospheric lamp, and with the breath of our own lungs, directly applied to the lamp in our own hand, we have personally proved, that the common air, by his apparatus, is rendered not only combustible, but brilliantly luminiferous. The components of this air-catalyzing, or air-filtering liquid, are, he says, abundant and cheap, and the liquid itself seems not to be diminished by the bubbling passage of the air through it. Blessings and honor to the genius, who thus shows the freezing and lightless poor, how to turn water into a wood-pila, and common air into a can of oil!—[Worcester Cataract.

The Worcester Spy says:—"Although the patent of the Hydro Electric Light has been secured, Mr. Paine has not remitted his investigations, and at last has discovered a process of catalyzing the oxygen of the atmosphere, and rendering it luminiferous at a mere nominal expense, without the cost of machinery or any other apparatus than an air receiver, capable of holding common air. We saw it in operation last evening in our office, examined it minutely, catalyzed the hydrogen ourself, and read by the light so produced, which is equal, if not superior to the best gas burned in the cities. The flame is peculiarly bright and brilliant, burns with a clear steady light, is entirely inodorous, and during the half hour that we watched its operation, we could see no consumption of the catalyzing material. The whole apparatus which we saw, could not have cost more than a couple of dollars, and it was capable of furnishing all the light needed for the illumination of an ordinary sized room."

[Well, this out-Herods Herod. We hope this wonderful catalyzing material is not very abundant, or we might expect Mr. Paine, after setting the river, would set the atmosphere on fire. Do the editors of the Spy or the Cataract know what they are talking about when they say that oxygen is "rendered luminiferous." Do they not know that sulphur, charcoal, and many of the metals, when previously heated, burn with great brilliancy in oxygen gas? Mr. Paine has been amusing them with some of the volatile hydro-carbons.

Discovery of Marl.

Professor Hall has discovered a large Gnatheden bed on Raft River, some eighteen miles from Mobile, in which are extensive deposits of marl of a very superior quality. The bed is made up of decomposed shells alluvial mud and other fertilizing matter. This marl, Professor Hall believes, is the best manure that can be employed upon the lands about Mobile. It is a permanent fertilizer, and placed upon sandy soils without any base except at a great depth, would render them not only productive, but serve to hold together the loose sand and form a good and lasting soil.

Our friend John Wise, the hero of a hundred ascensions has in preparation a monster balloon fit to carry aloft 16 persons of 150 lbs. each.

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Scientific American

NEW YORK, MAY 10, 1851.

Cannel Coal of Virginia.

We have now before us a beautiful specimen of the Cannel Coal of Kanawha, Va., and as our acquaintance with this kind of fuel is not inconsiderable, we have no hesitation in saying we believe it to be equal to any coal of the same kind in the world, and far superior to any other coal whatever for a great number of purposes. Cannel Coal breaks with a dull fracture, but is capable of receiving a polish like marble, and it can be worked with a knife or chisel into any form. We have seen beautiful ornaments made of it, and in a foreign paper, we recently noticed that a sofa had been made by a Scottish miner, for the Great Exhibition, out of this material. But beautiful though this fuel is, with its clean and hard, yet pliable grain, its value consists in its usefulness and superiority, as an article of fuel and a producer of light and heat. No coal can equal it for producing gas, either in quantity or quality, and this is a fact to which we hope some attention will be paid by our gas companies. It is stated to be better than the Cumberland coal of Maryland for raising steam, and is free from any liability to spontaneous combustion. Those bituminous coals which are liable to spontaneous combustion, contain a considerable portion of sulphur; this is the reason why they generate so much heat when packed together, and made wet with water.

If one part of water is added to six parts of strong sulphuric acid in a glass vessel, the liquid will be raised to nearly the boiling point. This generates the carbonic and hydrogen gases in the coal, and a spark will do the rest to set the whole on fire. It is not long since we gave an account of three vessels being burned by the spontaneous combustion of the coals which formed part of their cargoes. It is the absence of sulphur in cannel coal, which makes it so valuable for good gas. We would like to see more of this coal in our city, and hope that we may induce some to use it for domestic purposes. It burns in a grate like a candle, with a fine white flame, and leaves only a few white ashes behind. The coal fields of America are of greater extent than those of all the world beside. We have anthracite, bituminous, and cannel coals in abundance. Our people in New York know what the Liverpool and Pennsylvania coals are—bituminous and anthracite, but few, very few of them know anything about the beautiful cannel coal; not one in a thousand, we believe, has ever seen a sample of it. We trust that what we have said may be the means of bringing it more prominently into public notice.

Anhydrous Steam---"Stame."

It is well known to our readers that Mr. James Frost, engineer, of Brooklyn, has published a pamphlet wherein it is stated—and the method of performing the experiment is illustrated—that when steam is heated apart from water, it is doubled in volume by an addition of 4° of heat. This new property he denominates *stame*. All the chemists and engineers, from Black to Watt, Gay Lussac, and Dalton, assert "it requires 480° to double the volume of steam." It will be observed, if 4° of heat doubles the volume of steam, this is the great discovery of the age. Mr. Frost submitted his pamphlet to the *savans* of Cambridge, Mass., who, through Prof. Horsford, reported against its correctness, and Mr. Frost replied through our columns, as we had published the said report. We have always had a great respect for the statements of Prof. Horsford, as he is exceedingly precise in all he puts forth, but Mr. Frost is also a man of great scientific and practical knowledge. Thus the matter rested for more than a year, although we had many inquiries about "the correctness or incorrectness" of Mr. Frost's experiments.

The only person who seems to have given this subject his profound attention is Dr. Haycraft, of Greenwich, England, who has published his views in the London Mechanics' Magazine, in reply to Mr. Frost's pamphlet, which was also published in that periodical. He speaks with great respect of Mr. Frost's experiments, but he does not coincide with his ideas of the doubling of the volume of steam by an increase of 4°.

Twenty years ago he entertained nearly the same views as Mr. Frost, and had a small steam engine constructed of a 4 inch cylinder, tubular condenser, and steam jacket. The jacket was furnished with steam from a high pressure boiler. On working the engine with common steam, it required 85 revolutions to fill a given measure with condensed steam, but on applying steam of 500 lbs. pressure to the steam jacket, it required 920 revolutions to fill the same measure—a very great saving, as any of our readers will see, for the engine in both cases carried the same weight. From this experiment he was induced to believe that anhydrous steam—the *stame* of Mr. Frost—was ten times more economical than common moist steam. He afterwards had a large engine built with a fire around the cylinder, but the parts soon gave way; however, it confirmed him for a time in his former opinions. It occurred to him, one day, to make a calculation of the actual working of his engine, when he was astonished to find that his *stame* was just about equal to what it should be, supposing it to have the rarity of Watt—1728 times greater than water. On examining this he recollected a remarkable admission of that greatest of engineers, (Watt) that, in his best engines, there was a consumption of steam double of what was required by calculation. To prove whether there was a loss by escape of steam in a well-constructed engine, or a great increase of volume by super-heating it, Dr. Haycraft filled a graduated tube with mercury, closing one end and introducing into a part of it oxygen and hydrogen, in the same proportions in which they form water. These gases he detonated by wires and reduced them to water. The whole was placed in an oil bath, which was gradually heated to 210°, when steam was formed, filling the tube to a marked point. On this a calculation was made, which proved it to be increased in volume about 1728. Having ascertained this point, he began to increase the temperature of the oil to test the theory of Dalton, viz., that it required 480° of extra heat to double the volume of steam. He increased the temperature to 360°, all that his tube could bear, when he found that it made no sensible increase in the volume of steam. This experiment was repeated several times with the same result. This is at variance with Mr. Frost's experiments. He believes that Mr. Frost's tubes were moist on the interior surface, and that this moisture was not taken into account in calculating the quantity of experimental common steam.

Dr. Haycraft believes that the loss in common engines is attributable to a cooling in the interior of the cylinder every stroke of exhaustion; James Watt had a glimpse of this idea himself, when he applied the steam jacket, and according to Mr. Frost the steam engine has even retrograded since Watt's day. The Cornish engine, as it exhausts only every alternate stroke, consequently has less cooling inside, therefore it is easy to account for the great economy of fuel in those engines. Dr. Haycraft recommends a steam jacket to be applied to all locomotives especially.

One great drawback on the effective powers of engines is priming—the carrying up of a great deal of moist particles into the cylinders along with the steam. Dr. Haycraft recommends the strictest attention being paid to contrivances for preventing moisture being carried into the cylinder.

We must say, along with him, that this subject is not weighed with a sufficient estimate of its importance by our engineers, although the fact of its necessity is well known to all. Some locomotives, with the same pressure on the *balance* are 30 per cent. more effective than others. Why? "They shed their water better." Dr. Haycraft and Mr. Frost do not differ about the practical results, they only differ in theory. Mr. Frost believes that steam, subjected to a higher temperature is converted into *stame*. Dr. Haycroft believes that *stame* is only what is known by the name of anhydrous steam (steam free from watery molecules).

In the last number, (April 12th) of the London Mechanics' Magazine, Mr. Frost has a reply to Dr. Haycraft, but it does not touch the main points of this new theory, viz., that 4° of heat doubles the volume of steam and changes it into "stame." We have been informed that Prof. Stevens of the New York University, purchased the patent of Mr. Frost for the principal kingdoms of Europe, and that Mr. Collins purchased part of the English, if not the whole of it, and has stated that the reason why he did not apply Mr. Frost's discovery to his fine new steamers, was not owing to his disbelief in its merits, but because, he said, (as we have been told, but we do not give it as on our own authority), "if it were applied, it would enable small capitalists to compete with large ones in steam navigation." This opinion is contrary to what we would expect. and we are inclined to believe that there must be some mistake about it.

Paving Streets by Torch Light.

Why don't our Street Commissioners get the cobble stone pavements repaired by torch light? Let a section be taken up and completely laid down by morning, and do not let a single stone be touched during the hours between 10 A. M. and 6 P. M. It is confusion confounded in our streets whilst being repaired, (and when are they not) for whole lines of stages, like moving caravans, have to turn abrupt angles, and deploy out of line hundreds of times in one day, all owing to twenty or thirty men digging and driving away at the repairing of some small piece of pavement. The streets never need be obstructed on this account, and thus thousands, by tear and wear, in making long circuits and losing time, would be saved to the citizens every year. It may be said that this would be more expensive to the city. It would not; it would be a great saving, for every mile a carriage is saved in travelling so is there less wear of pavement, and who can doubt but 10,000 vehicles have to travel, every day, more than one mile each out of their direct routes, by obstructions in the repairing of streets. This amounts to the astonishing number of 3,650,000 in a year. If we take the half of this, we have nearly two millions of miles of unnecessary travel, and the time lost is incalculable. Plenty of men can be found who will work at night, if paid fair wages; and we venture to say that they will do more work in the same time, by torch-light, than they can by sun light. Why? because they have to be continually on the look-out for horses prancing up to the flanks of their barricades. Their work is generally hurried and miserably done—it certainly could not be performed worse blindfolded. Let the Common Council try an experiment—a fair experiment, and with perseverance they would soon come to the conclusion that our streets can be kept in better repair, never be obstructed, and city funds will be saved by adopting the plan of paving our streets (for repairs only, we mean,) by torch-light.

Thayer's Bridge.

Mr. George W. Thayer, of Springfield, Mass., called upon us last week, on his way to North Carolina, to erect one of the Bridges which bear his name, with a span of 200 feet, on the line of the Wilmington and Weldon Railroad. Mr. Thayer has put up one of his bridges on the Georgia Railroad, and it gives universal satisfaction to the engineers. We published an illustrated description of Mr. Thayer's bridge on page 190, Vol. 2, Scientific American. Since that period many improvements have been added by the inventor, and it is not too much to say he has built some of the best railroad bridges in our country.

When we take a retrospective view of the inventions which have either been illustrated or noticed in our columns, since the commencement of the Scientific American, it gives us no small satisfaction to know that so many of them are now in successful operation. It is not possible for any man to keep up with the progress of improvements in the arts unless he takes a paper devoted to the propagation and discussion of science and art. There is scarcely a day passes over our heads but we have to refer to the back pages of our paper, to show that such and such a thing has been described by us before. We have, in a number of cases, had to refer to Mr. Thayer's bridge, as embracing the principle of what an inventor considered something new. One man, after he had spent about two years on an improvement in boiler feeders, came on to New York with his model, and after showing it to us, we pointed out its homologue in Vol, 2 of our paper. He declared it would have saved him $400 if he had been a subscriber to it from its origin.

Light Locomotives.

We learn by the "South Boston Gazette" that Mr. Seth Wilmarth, of the Union Works, in that place, has built a locomotive which only weighs eight tons, for the Cumberland Valley Railroad. The boiler is 9 5-12 feet in length, and 2 3-12 feet in diameter. The cylinder is 8½ inches in diameter with a stroke of 14 inches. The heating surface of the fire-box is 13 square feet, the heating surface of the tubes is 190 square feet. There are 64 tubes, each 7 feet in length, and 1¾ inches in diameter. The locomotive and tender form a part of the same frame, the tank being capable of holding 400 gallons, the boiler, 168 gallons. The whole length of the locomotive is 18 feet, which is placed upon a pair of leading wheels 30 inches in diameter, a pair of trail wheels of the same dimensions, and a pair of driving wheels 4½ feet in diameter. It has been used on the Brookline branch of the Worcester Railroad, much to the satisfaction, it is stated, of the engineers, and Mr. Wilmarth has entered into contracts to build two more of the same size. For branch railroads, on which there are but light trains, it is folly to employ heavy engines, but the grand point is to hit the weight suitable for the work to be done. Engineers in America and Europe are now giving this part of engineering great attention, but certainly no more than it deserves.

Electrotyping---Our New Heading.

The heading of the "Scientific American," this week, is a specimen of the progress of science. Hitherto types were either cast or carved, but the "heading" spoken of was performed by the same element as the lightning which cleaves the oak of the forest, and shatters the mast of many a gallant ship. The characters are of copper done by the electrotype process, by Mr. J. W. Wilcox, of Boston, who has been engaged in the business for the last five years, and has perfected the art so that it is no longer an experiment, but one of the "fixed facts" of science. Duplicates of wood-cuts, copper plates, type, &c., are warranted perfect, and copies of wood-cuts print as well as the wood itself, while they last ten times longer than either wood or types. It is a splendid art for the stamps used in cotton factories and bleaching establishments.

This is an art of very extensive application. It is very useful but it requires great skill and practice to be master of it. Those who desire copies of figures in hard enduring metal, Mr. Wilcox is the man to perform the work desired n the very best manner.

Banvard, the American Artist.

John Banvard, the artist, whose Panorama of the Mississippi excited so much attention both at home and in England, is now in the Holy Land. He was wrecked on the Nile by a real African Simoon. He lost his gold watch and all his money, but luckily, he says, his sketch-book and drawings were saved, and this made him forget all the rest. A number of Americans were along with him, and were very kind. The Rev. Dr. Scott, of New Orleans, and Capt. McCallum, of the West Point Military Academy, were very attentive and kind to him, they being one mile ahead and in a place of safety, came to the rescue with great dispatch.

Banvard will bring home some rare specimens of oriental scenery—true to nature in every respect. He paints no imaginary scenes, like Gliddon's Nile, and some other panoramic nonsense.

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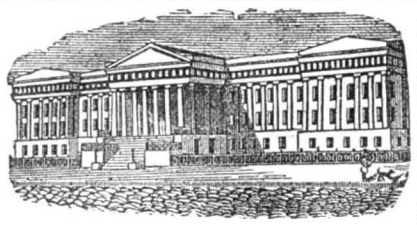

☞Reported expressly for the Scientific American, from the Patent Office Records. Patentees will find it for their interest to have their inventions illustrated in the Scientific American, as it has by far a larger circulation than any other journal of its class in America, and is the only source to which the public are accustomed to refer for the latest improvements. No charge is made except for the execution of the engravings, which belong to the patentee after publication.

LIST OF PATENT CLAIMS
Issued from the United States Patent Office.

FOR THE WEEK ENDING APRIL 29, 1851.

To I. L. Cady, of New York, N. Y., for improved compound Metallic Door, for vaults, safes, etc.

I claim a door or wall, for a vault or safe, made by securing to each other, at a certain distance apart, two plates of sheet metal provided with a rim or curb, and filling the vacant space between them with immaleable cast iron, poured in while melted, substantially as described.

To Oliver Etnier, of Shirley Township, Pa., for improvement in Winnowing Machines.

I claim placing the screen in an inclined position above the fan, and extending the whole length of the machine, by which the wheat is thoroughly sifted before being acted on by the blast, in combination with the direction of the blast, at right angles to the screen, as above set forth.

To J. C. Smith, of Stoughstown, Pa., for improvement in Spring Saddles.

I claim the pommel spring, in combination with the seat spring, substantially as set forth.

I also claim the method of suspending the stirrups, by connecting them with the same springs which support the seat, whereby the elevation and depression of the one is simultaneous with the elevation and depression of the other.

To J. G. Goshon, of Shirleysburgh, Pa, & Wm. H. Towers, of Bucyrus, Ohio, for improvement in apparatus for giving ease to the arms in writing.

We claim constructing an arm supporter or rest, so formed and shaped as to fit the arm below the elbow joint, and serve as an elastic or flexible support or rest, on which the arm of the penman is supported and balanced and permitted to move or turn with the motion of the arm, with the utmost freedom and ease to the writer, by which all numbness, contraction of the muscles of the fingers, and crampness or stiffness of the arm, is effectually prevented and the arm rendered free in its movement, and under the complete control of the writer, as described.

To Ira H. Smith, of Wolcott, Conn., for improvement in machinery for making matches.

I claim, first, the mode of feeding in the plates of wood, by means of the feeding apron with its cleats, spring, pulley, and rollers.

Second, the mode of separating and dipping the splints, by means of the grooved cylinder, cutter, endless bands, and revolving wheels.

To R. G. Babcock, of New London, Conn., for improved Horse Shoeing Machine.

I claim, in combination with a rotating travelling draw roller, adjustable pattern, and clamping tool for forming the shoe, the gauge plate for holding up the roller, so as to allow it to return over the shoe thus formed and smooth down the feathered edges raised by the chamfering tool, as described.

To L. W. Boynton, of South Coventry, Conn., for improvement in Bats for felting.

I claim preparing the web for felt fabrics, by the introduction of layers of flock between or upon the layers of wool, without passing the flock through the carding machine, but by preparing it in a separate machine, and introducing it immediately from that machine on to the web of wool, while it is passing from the carding machine, in the manner substantially as described.

And I also claim the combination of the endless apron, which feeds the flock to the cylindrical brushes, with the series of cylindrical brushes by which the flock is taken up from the inner extremity of the endless apron, and, passing through the series, is prepared and sent down through the spout or conductor, and deposited on the web of wool, as before described, when the same is constructed and combined, substantially as described.

To L. L, Gilliland, of Dayton, Ohio, for improvements in Splint Machines.

I claim a cutter wheel, constructed substantially as herein set forth, to split, point, and gauge the size of match splints, in combination with the method of preventing the splitting knives from cutting across the grain of the wood, by supporting the block upon a stock, which is constructed to turn, as herein set forth, to present the grain of the wood, where the splitting knife is acting in line with the plane in which the knives revolve.

To Wm. Mt. Storm, of New York, N. Y., for Flexible Hose or Float, for supporting vessels.

I claim, first, a plan of supporting a vessel, in whole or part, upon or by means of a flexible, movable, endless hose or air-float, or on an endless movable chain of flexible, buoyant compartments, for the purposes set forth.

Second, I claim making my flexible hose air-float, or its equivalent, collapsible, for the purposes herein set forth.

Not limiting myself, in or by these claims, to any particular forms or arrangement of the buoys or floats, &c., so long as the peculiar features of my invention, as described and claimed, are substantially fulfilled.

RE-ISSUES.

To Frank Cheney, of Manchester, Conn., for improvement in machinery for doubling, twisting, and reeling thread. Originally patented Oct. 9, 1847.

I claim the described combination of doubling, twisting, and reeling mechanism, or elements, constructed, applied, and operating together, substantially as herein described, whereby I am able to double, twist, and reel each thread by the same machine, substantially in the manner specified.

DESIGNS.

To Thomas Ball, of Boston, Mass., for Design for Bust of Jenny Lind.

(For the Scientific American.)

Practical Remarks on Illuminating Gas.

[Continued from page 262.]

Having now traced this aeriform fluid through its various and diversified mutable course, from the crude coal to the pure dispenser of light, it may not be improper for me to recapitulate a little and speak of the available products accruing from the destructive distillation of coal. In the first place I would call the reader's attention to the residuum remaining in the retort after the gas has been extracted; this residue is a carbon of dense granular composition, and is called coke. This is the most valuable of the secondary products of a coal gas establishment. It bears the same relation to coal as does charcoal to wood—it is excellent for many purposes, and is extensively used both in the arts and manufactures; for domestic use it is unobjectionable, and may be burnt both in the drawing-room and kitchen with much economy and comfort. Coke has become a very general favorite as a fuel for family use within a few years, wherever it has been introduced; the demand at gas manufactories is constantly increasing, as its merits become better known and its true value appreciated, and the result has been that all coke manufactured finds a ready market at good remunerating prices. The price of coke generally bears a proportion to the cost of the coal from which it is produced; and in some works the price is fixed from time to time, to cover the price of the coal used to make it, and the other residuums considered of no value for sale. As a fuel, where intensity of heat is requisite, coke is unequalled. In the smelting of ores at Silisia, it was found, in one experiment, that 1 measure of coke was equal to 3 measures of charcoal; and in another experiment, that 1 measure of coke equalled in effect 5 measures of charcoal or 3 measures of pit coal.

Coal, although it decreases in weight while undergoing distillation, increases in bulk; 1 measure of coal producing 1½ measures of coke: Pictou coal increases about 20 per cent. in bulk while undergoing decomposition.

Coke is sometimes, though rarely, found in nature. A porous anthracite or natural coke has been discovered in Eastern Virginia, and from its position, it is thought that its presence must be ascribed to the thorough carburization and dessication of the vegetable matter before it was sealed in by the overlaying strata. Coke is then found to be pit coal deprived of its volatile ingredients by charring, whereby it is converted from a solid state into a light spongy mass.

Coke, as soon as manufactured, should be housed or placed under cover in some sheltered position, as owing to its great degree of porosity, it absorbs moisture from the atmosphere, which it becomes necessary to expel before a perfect combustion can be obtained, and which decreases the amount of heat generated; or rather, much of the heat derived from the coke is required to convert the water into steam, and thereby renders it unsuitable for giving the best attainable results.

Another secondary product is Coal Tar:—this is a black oily fluid, much resembling the vegetable tar in appearance, but has a much more pungent odor. This substance may be consumed in the fires under the retorts with advantage; when this is done, it is necessary to introduce a small quantity of water at the same time, as, owing to the excess of carbon contained in the tar, it is necessary to produce a flame, to give it a due proportion of hydrogen, and also a supply of oxygen for its support; and for this purpose water is used, (that containing both of these elements,) and the whole of its heating properties are made available; when this method is judiciously employed, it is capable of giving not only a great amount, but a very intense heat. The quantity required to carbonize one chaldron of coal varies from 24 to 27 gallons; 3 gallons being considered equal in value to one bushel of coke. Coal tar is used when boiled and mixed with oil, as a black varnish, for the protection of iron against oxidation; it possesses a beautiful lustre and serves as an excellent preservative; the most desirable feature in this varnish is, that it can be applied to red hot surfaces without injury, while other varnishes would crack off and lose their lustre. It has also been introduced, when mixed with any silicious substance, as a cement for floors, roofs, walks, &c. It is very desirable, when used as a floor, particularly in store houses where woolen goods are deposited, not only for its great durability, cheapness, and freedom from moisture. but the odor which is naturally attached to the tar, serves as an excellent preservative against moths. As a roof it is very durable, and is impermeable to water; and when employed as walks, is a most excellent substitute for stone or brick, its durability being fully equal to either of these substances, and in point of cheapness, far superior. It is not acted upon injuriously by the frost, as its elasticity allows it to yield without damage. It has been thoroughly tested, and its superior excellence is acknowledged by all who have used it.

Ammoniacal Liquor is another valuable secondary product, which is collected in passing over, upon the surface of the coal tar. It is highly charged with ammonia; 4 oz. of carbonate of ammonia have been produced from one gallon of this liquor. Its odor is exceedingly pungent. This liquor to the agriculturist must be of great value, for it is well known that carbonic acid, water, and ammonia contain the elements which support both animal and vegetable life, and when this is applied it supplies the deficiency of any of these elements, for the want of which his crops would fail, This liquor is also useful for the manufacture of sal ammoniac or chloride of ammonium The ammonia which chrystallizes in the various parts of the apparatus, and may be collected in quantities, as salts of ammonia or carbonate of ammonia may be used in preparing the popular sudorific called spirit of hartshorn.

The refuse lime from the purifiers is also a valuable product, and at some works it is sold at prime cost, as a manure, being considered, from its strong impregnation with ammonia, as being improved in quality for that purpose.

Another material which has been introduced for the manufacture of illuminating gas, is Oil, although to a very limited extent as compared with the use of coal. The oils are divided into two classes, "volatile" and "fixed." The volatile oils are so called because they are evaporable at a low temperature without decomposition, and because in them the odor or fragrance, or, as the old chemists termed it, the essence of the vegetable consists. Oils of this kind are generally obtained from vegetables, and are mainly fluid. The fixed oils are so called because they are incapable of being volatized without decomposition. All animals, except those included in the class of insects, contain oil; in the herbiferous animals it is hard; in the carniverous and in birds it is soft, and in fishes it is liquid. The latter class only will command our attention at the present time, it being the only oil which is used for gas illumination on a large scale. Its principal elements are carbon. hydrogen, and oxygen.

Oil Gas.—When oil is brought to a high temperature it is decomposed into a gaseous mixture, and new combinations are formed, which consist of bi-carburetted hydrogen, carburetted hydrogen, and carbonic acid gases. The two first named are formed by the combination of carbon and hydrogen, in the first instance 4 parts of carbon unite with 4 parts of hydrogen, the atomic formula being H^4+C^4, while in the latter case 2 parts of hydrogen unite with 1 part of carbon, and have a formula H^2+C. The carbonic acid is formed by the combining of 1 measure of carbon and 2 measures of oxygen.

It would appear both inexpedient and superfluous to distil oil for the production of gas, when we consider that oil can be burnt in lamps without further preparation, and that it loses carbon by deposition in the retorts. The oils most commonly used for gas purposes are those whose impurities will not admit of their being burnt in lamps, such as the train oils and the sediment of whale oils, and consist of phocenic acid and oxide of glycerle, which form, by the incipient decomposition of the animal matters, and are the cause of the nauseous odor. The manufacture, therefore, is not so absurd as at first sight it appears, as it is the means of using up such materials for the production of light, as would otherwise be lost.

J. B. B.

(To be Continued.)

Mexican Cave.

A correspondent of the N. O. Picayune, in writing a description of an exploration of a mountain called Guieugola, about five leagues from Tehuantepec, gives the following account of the discovery of a cave in its side:—

After much hard climbing, near the top of a spur, we discovered a cave of a small entrance, and descended into it about seventy-five feet. From the top or roof of the cave we found suspended stalactites of limestone, some of which were of enormous size and of a brilliant snow white color. These stalactites, when struck by a hard substance, make a musical sound similar to that of an organ. In one part of the cave is a formation of them which very much resembles an organ, and is capable of producing as many different sounds. An apt musician could make beautiful music upon this natural organ. The general direction of the cave is downward, at an angle of about forty-five degrees. As far as we went there were several large openings or rooms, with a level floor, and passages from one to the other, varying from three to eight feet in diameter. How far it extends we do not know, as we did not explore it to the bottom. It has evidently at some period been inhabited, for we found several pieces of clay ware, one of which was in nearly a perfect state of preservatian.

Rapidity of the Nervous Current.

In a paper presented to the French Academy of Sciences, "On the rapidity of the propagation of the nervous agency in the spinal nerves"—Helmholts described at length some experiments of his, from which he concludes that the nervous irritation passed over a space of 50 to 60 millimetres (about two inches) in from 0·0014 to 0·0020 of a second. The experiments were upon frogs. The lower the temperature, the less appears to be the rapidity of the nervous agent.

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TO CORRESPONDENTS.

F. H. S., of Pa.—We have never known any measure like yours being used. We believe it to be patentable.

A. S., of Ohio.—The experiments of Paret were electric experiments, and are claimed by Mr. Paine, Paret having borrowed the idea. You have already been informed of such experiments through our columns.

C. T., of N. Y.—You say truly that 16 wheels are more safe than 8 wheels, on a car. We do not, nor would any other person, dispute this point, but this greatly adds to the expense of the car. Taking a second view of your rails, we made a search to try and find out if there were any like them ever used before We could not discover any, and consider them new and patentable.

L. W. B., of Mass.—The first 35 Nos. of the Scientific American, Vol. 5 can be furnished if desired. Price $1,30.

J. W. E., of Tenn.—Your name was entered at McMinville, Penn., by mistake. We have sent the back numbers to render your files complete. The same mistake occurred on the "Sun" mail books, which we have had also corrected.

A. A. E., of Brooklyn.—We can supply all the numbers your friends want, with the exception of No. 1.

O. P. S , of Mass.—The Scientific American is the only journal in this country devoted strictly to the Arts and Sciences, with the exception of the Franklin Journal, at Philadelphia, which is a monthly.

A. E. Z., of Me.—A Drying machine was brought into use in Paris, in 1839; it acted on the centrifugal system, and consisted of two drums or cylinders, one within the other, the inner one being pierced with holes. It is said to have been revolved at the rate of 4,000 times per minute.

A. R., of N. C.—Casein is the basis of the various kinds of cheese, and closely resembles albumen in many properties. It is a curdy white substance, insoluble in water or alcohol, but soluble in water containing an alkali or its carbonate. It is coagulable, and is separated from the milk in making cheese.

R. E. J., of Texas.—The specimen you send is no doubt basaltic rock; you can do nothing with it. We believe it is found in abundance in many portions of Mexico; it oft times presents a singular appearance when viewed from a distance—like some ruined work of art, building, etc.

R. Y., of Boston.—Mr. Wylde's great Globe is on exhibition at the World's Fair. It is said, by our correspondent to be a fine work of art.

P. & W., of N. Y.—The engravings of your machine are now being executed and will appear in the course of a week or two. We mean to have them well done.

C. E., of Pa.—Mr. Kase'spump is manufactured in London, we notice, by Key & Marshall, of Newgate st.; it has been well spoken of by some of our English cotemporaries.

J. H., of Ala.—We shall respond to your inquiry as soon as possible and will give all the information we can about the matter. Little hope, we think.

J. S., of Ohio.—There is a feature in your bridge that we have not particularly noticed in any other, yet it is difficult to tell about its novelty, as there is an endless variety in use. We should think the "Howe Bridge" covered the essential features in yours. $2 received.

W. P., of N. J.—We could not have the engravings made for less than $12. Please remit, and they will be attended to without delay.

J. F. M., of Phila.—The engravings of your patent will probably appear in our next.

L. A. S., of Pa.—You can sell only what you patent; the lever, however, could go with it as an improvement. The purchaser would not object to this. $1 received.

P. H. W., of N. Y.—You will please to forward a rough sketch of your improvements, in order that we may see more clearly into the nature of them.

E. A. D., of La.—Your letter of the 20th ult. came safe and was answered by letter. The point stated was incorrect, and we advised you to abandon the idea of making an application.

H. A. L., of N. Y.—We were shown the drawings but did not examine the principle of the invention for the Feed. There are a number of centrifugal force pumps now in operation; Stiven's is the best of the kind; it is eccentric inside. We do not know what you mean by the "rotering plate;" it requires to be more minutely described.

J. K., of N. Y.—Your manuscript cannot be returned, because we do not know where it is. No request was made to send it back if it was found unsuitable. If we should keep all the papers sent us, we would soon have a room full.

A. B. N., of Pa.—You are secure unless the disclaimer spoils all that was considered valuable about the patent.

H. W. O., of Ct.—We have no drawings of Mr. Callaghan's Dredge Boat; it would doubtless interest many to see it illustrated in the Scientific American. The claim we can send you, if desirable.

V. H., of Me.—We examined the principle you refer to some two years since, and found it incorrect. No subsequent attempts have been made to revive it, and we presume none will be.

C. E., of N. C.—We do not think you could obtain a patent for your improvements. You will see, by reference to page 43 of Macfarlane's "History of Propellers," that Mr. Hill, of Woolwich, Eng., invented the same device.

R. A., of Md.—Ammonia is a transparent pungent gas, formed by the union of nitrogen and hydrogen, and named from the substance sal ammoniac, of which it constitutes the basis.

A. W. P., of Ohio.—Your case is progressing, and we shall hope to send the specification in a few days.

B. N., of N. Y.—We hope the patent for your lifting apparatus will be issued in a few days.

Enquirer—In the year 1849 a patent was granted for surrounding the piston rod, inside of the stuffing box with a piece of leather, vulcanized india rubber, or some other fit material, in the shape of an hour-glass without top or bottom. A communication is formed between the interior of the stuffing-box and a force pump, and fluid is pumped into the space between the inside of the box and and the outside.

B. & K., of Va.—The law relating to patents, in Canada, is little understood by Americans, as it is but recently that such prerogative has been extended to the Governor, and we believe the privilege is only for residents. We are now in correspondence with a party in Canada, with a view of securing such patents for our citizens.

M. I., of N. Y.—To form a dipping needle, an axis is passed through a needle of the same shape as the compass needle; the terminations of the axes are conical, and they fit into small heles of the same shape, in two cross bars. The needle, before it is magnetized, must be made so as to lie perfectly horizontal when suspended between those bars.

H. G., of Geo.—We shall commence Vol. 7 of the Scientific American with 20,000 copies, and must rely upon our friends to circulate them. We are anticipating improvements which will enhance the interest of its columns very much. Your kind favors are duly appreciated.

J. F., of Pa.—We believe that it will be of great benefit to you to get an engraving published in our columns.

Money received on account of Patent Office business since April 29 :—

S. A., of Pa., $30; S. & P., of N. Y., $20; E. B., of N. Y., $30; A. W. D., of N. Y., $20; D. E. S., of O., $30; A. K., of N. Y., $25; G. B. W., of Mass., $25; F. & J. N., of L. I., $10; T. H. D., of N. H., $40; B. & B., of Vt., $10; A. S. H., of N. Y., $30.

Specifications and drawings of inventions belonging to parties with the following initials, have been forwarded to the Patent Office since April 29:

E. B., of N. Y.; G. B. W., of Mass.; H. B., of Ct.; A. W. D., of N. Y.; B. & B., of Vt.

New Edition of the Patent Laws.

We have just issued another edition of the American Patent Laws, which was delayed until after the adjournment of the last Congress, on account of an expected modification in them. The pamphlet contains not only the laws but all information touching the rules and regulations of the Patent Office We shall continue to furnish them for 12 1-2 cts. per copy.

Patent Claims.

Persons desiring the claims of any invention which has been patented within fourteen years can obtain a copy by addressing a letter to this office; stating the name of the patentee, and enclosing one dollar as fee for copying.

ADVERTISEMENTS.

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" 12 lines, 75 cts., " "
" 16 lines, $1,00 " "

Advertisements should not exceed 16 lines, and cuts cannot be inserted in connection with them at any price.

American and Foreign Patent Agency.

IMPORTANT TO INVENTORS.—The undersigned having for several years been extensively engaged in procuring Letters Patent for new mechanical and chemical inventions, offer their services to inventors upon most reasonable terms. All business entrusted to their charge is strictly confidential. Private consultations are held with inventors at their office from 9 A. M., until 4 P. M. Inventors, however, need not incur the expense of attending in person, as the preliminaries can all be arranged by letter. Models can be sent with safety by express or any other convenient medium. They should not be over 1 foot square in size, if possible.

Having Agents located in the chief cities of Europe, our facilities for obtaining Foreign Patents are unequalled. This branch of our business receives the especial attention of one of the members of the firm, who is prepared to advise with inventors and manufacturers at all times, relating to Foreign Patents. In the item of changes alone, parties having business to transact abroad, will find it for their interest to consult with us, in preference to any other concern.

MUNN & CO.,
128 Fulton street, New York.

LATHES FOR BROOM HANDLES, Etc. We continue to sell Alcott's Concentric Lathe, which is adapted to turning Windsor Chair Legs, Pillars, Rods and Rounds; Hoe Handles, Fork Handles, and Broom Handles.

This Lathe is capable of turning under two inches diameter, with only the trouble of changing the dies and pattern to the size required. It will turn smooth over swells or depressions of 3-4 to the inch, and work as smoothly as on a straight line, and does excellent work. Sold without frames for the low price of $25—boxed and shipped, with directions for setting up. Address, (post paid) MUNN & CO.,
At this Office

PATENT BAND PULLEYS.—The subscriber having obtained a patent for his improvements in the band pulley is desirous of disposing of rights to manufacture and use in the Northern and Western States. This improvement has been highly recommended by Southern planters and manufacturers who have purchased and used it during the past two years. Address, post-paid, JOHN SIMPSON, Decatur, De Kalb Co., Ga. 1am 3

MECHANICS' INSTITUTE FAIR.—The attention of Mechanics, inventors, and artisans is especially called to the Polytechnic Exhibition, which will open at the rooms, cor. Bowery and Division st, on the 15th of May. Those who wish to exhibit models, machinery, &c., of mechanical skill, and those who would like to carry on, permanently, any mechanical occupation that would be in any way curious or attractive to visitors, are requested to call on the Actuary. Steam power will be provided. Well-lighted, warmed, and airy rooms can be had on liberal terms. As this Exhibition is permanent, an excellent opportunity is offered to skillful mechanics to bring themselves into notice. Articles may be sent in immediately and will be taken care of and insured. Z. PRATT, Prest.; T. C. DODD, Actuary. 34tf

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MOUNT PROSPECT INSTITUTE, West Bloomfield, N. J. (6 miles from Newark).—The object of this Institution is to prepare lads for business in every department of active life; mathematics and the sciences receive particular attention; surveying and civil engineering is carefully attended to; students make frequent surveys, and prepare draughts and maps of their surveys, and draw plans of bridges, locks of canals, &c. Instruction is also given in linear, perspective, and mechanical drawing. Terms from $160 to $200 per year. The sessions commence on the first day of May and November.

WARREN HOLT, Principal and Proprietor.

References—Geo. Gifford, Esq., 17 Wall st.; S. R. Parkhurst, Esq., 70 Broad st., N. Y.; Prof. James J. Mapes, Newark, N. J. 34 4*

WOODWORTH'S PATENT PLANING MACHINES: 1851 TO 1856.—Ninety-nine hundredths of all the planed lumber used in our large cities and towns continues to be dressed with Woodworth's machines. Persons holding licenses from the subscriber are protected by him against infringement on their rights. For rights in the unoccupied counties and towns of New York and Northern Pennsylvania, apply to JOHN GIBSON, Planing Mills, Albany, N. Y. 28 7eow*

LEONARD'S MACHINERY DEPOT, 109 Pearl st. 60 Beaver, N. Y.—The subscriber is constantly receiving, and offers for sale, a great varlety of articles connected with the mechanical and manufacturing interest, viz., Machinists' Tools—engines and hand lathes, iron planing and vertical drilling machines, cutting engines, slotting machines, bolt cutters, slide rests, universal chucks, &c. Carpenters' Tools—mortising and tennoning machines, woodplan g machines, &c. Steam Engines and Boilers, from 5 to 100 horse power. Mill Gearing,—wrought iron shafting, brass and iron castings made to order. Cotton and Woolen Machinery furnished from the best makers. Cotton Gins, hand and power, and power presses. Leather Banding of all widths, made in a superior manner, from the best oak tanned leather, Manufacturers' Findings of every description—bobbins, reeds, shuttles, temples, pickers, card clothing, roller cloth, potato and wheatstarch, oils, &c. P. A. LEONARD. 33tf.

SCRANTON & PARSHLEY, New Haven, Conn., will have finished by the 10th of May, 12 Slide Lathes, with 8, 10, and 12 feet beads; these lathes swing 21 in., have back and screw gear, have over-head reversing pullies, all hung in a cast-iron frame, with drill, chuck, centre, and follow rest., S. & P. will also have 12 upright drill presses ready to ship at the same time; they have also constantly on hand 5 and 9 feet power planers, the same as heretofore advertised in this paper. Hand Lathes and slide lathes constantly on hand. Cuts, with full descriptions and prices, of the above tools can be had by addressing as above (post-paid.) 33tf

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PATENT CAR AXLE LATHE.—I am now manufacturing and have for sale the above lathes: they will turn and finish six sets per day, weight 5,000 lbs., price $600. I have also for sale my Patent Engine Screw Lathe, for turning and chucking tapers, cutting screws, and all kinds of common job work; weight 1300 lbs., price $225, if the above lathes do not give good satisfaction, the money will be refunded on the return of the lathe, if within six months. J. D. WHITE,
32 13* Hartford, Conn.

STEAM ENGINES AND BOILER—Several Steam Engines, now finishing, from five to fourteen horse-power; also one of 15 and one of 25. Having just enlarged my manufactory, I am now prepared to make all sorts, from 2 to 50 horse-power, of the best materials in all their parts. One second-hand engine of 8 horse-power, two cylinders, in good order, for sale, with new boiler, $575. Also Galvanized Chain for chain-pumps. AARON KILBORN.
No. 4 Howard st., New Haven, Conn. 32 19*

LAWRENCE SCIENTIFIC SCHOOL—Harvard University, Cambridge, Mass.—Special Students attend daily, from 9 o'clock, A.M., till 5 o'clock, P. M., in the laboratories, and under the direction of the following Professors:—Louis Agassiz, Professor of Geology and Zoology; Jeffries Wyman, M. D., Professor of Comparative Anatomy; Henry L. Eustis, A. M., Professor of Engineering and Physiology; Eben Norton Horsford, A. M., Professor of Chemistry. Instruction is also given by Prof. Pierce in Mathematics; Prof. Lovering, in Physics, and the Messrs. Bond at the Astronomical Observatory. All lectures delivered to under-graduates of the College are free to members of the Scientific School. For further information apply to E. N. HORSFORD,
29 6* Dean of the Faculty.

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Berlin, Conn., Nov. 1, 1850. 7 1amly

A CARD.—The undersigned beg leave to draw the attention of architects, engineers, machinists, opticians, watchmakers, jewellers, and manufacturers of all kinds of instruments, to his new and extensive assortment of fine English (Stubs) and Swiss Files and Tools, also his imported and own manufactured Mathematical Drawing Instruments of Swiss and English style, which he offers at very reasonable prices. Orders for any kind of instruments will be promptly executed by F. A. SIBENMANN, Importer of Watchmakers' and Jewellers' Files and Tools, and manufacturer of Mathematical Instruments, 154 Fulton st. 29 3m*

DICK'S GREAT POWER PRESS.—The public are hereby informed that the Matteawan Company, having entered into an arrangement with the Patentee for the manufacture of the so-called Dick's Anti-Friction Press, are now prepared to execute orders for the following, to which this power is applicable, viz.—Boiler Punches, Boiler Plate Shears, Saw Gummers, Rail Straighteners, Copying and Sealing Presses, Book and Paper Presses, Embossing Presses, Presses for Baling Cotton and Woollen Goods—Cotton, Hay, Tobacco, and Cider Presses; Flaxseed, Lard, and Sperm Oil Presses; Stump Extractors, &c. &c. The convenience and celerity with which this machine can be operated, is such that on an average, not more than one-fourth the time will be required to do the same work with the same force required by any other machine.

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33 2 Address P. A. LEONARD.

HOVEY'S PATENT STRAW CUTTER.—Wm. Hovey, of Worcester, Mass., has opened a wareroom for the sale of his Cutters, at 60 Courtland st., New York. WM HOVEY, Patentee. 32 *4

WILLIAM W. HUBBELL—Attorney and Counsellor at Law, and Solicitor in Equity, Philadelphia, Penn.

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Scientific Museum.

Cultivation of Cinnamon.

The Island of Ceylon is the great country for Cinnamon. This island is about 900 miles in circumference, and lies at the entrance of the Bay of Bengal. The first Europeans who settled there were the Portugese. The Dutch in 1551 took the island from the Portugese. In 1795 it was conquered by the British, in whose possession it has since remained. The natives are pleased with the government, and there is ample protection for all classes. There is an American Mission Station there, which has had success.

The cinnamon for which Ceylon has been famous, and which is well known to us all, is the inner bark of the *Laurus Cinnamonia*, a beautiful tree, attaining the size, and something the appearance of a moderately large pear-tree. To produce fine bark—such as is required for purposes of commerce—the tree must be felled, and the root forced to grow in shoots, straight and smooth. These being cut when eighteen months or two years old, a fresh supply of young sticks rapidly appears after the first rains.

The English Government possess five cinnamon plantations in Ceylon, containing in the aggregate about twelve thousand acres. These have nearly all been sold to private individuals, some of whom allow their estates to be very much neglected; others keep them in a a state of high cultivation.

The whole of the Ceylon coast is low and sandy, and generally favorable for the growth of cinnamon, which flourishes in a hot and damp atmosphere, such as is there found.

In former days, the cultivation, as well as the after preparation of the spice was exclusively carried on by one particular caste of Cingalese, called "Chalias," who had headmen, or petty chiefs, of various grades placed over them, belonging to their own body. This system is now partly changed, and the preparation is alone carried on by the "Chalias." This being their hereditary occupation, they are, as might be expected, very expert in their operations.

The "Chalias" are assembled at break of day in gangs of thirty, with a "Canghan," or native overseer of field work, over each. All are armed with a sharp, light bill hook, and a stout cord to tie up the sticks when cut. The European superintendant, having seen each gang properly equipped, accompanies them to the spot appointed for the day's cutting, to which they march in good order; each party is then placed, and, at a signal from the superintendent, the men, to the number perhaps of two hundred, rush among the bushes with loud shouts and cheers, and the work of destruction commences in good earnest. The peelers are paid according to the quantity of spice they prepare, and it may therefore be imagined how anxious each one is to secure a good bundle of sticks. By ten or eleven o'clock the peelers have cut sufficient cinnamon to occupy them in the barking process for the remainder of the day; and having collected all their sticks in bundles, they proceed to the "peeling house." They seat themselves cross-legged on a rush mat; and with a curiously-shaped little knife, strip the tender bark. It is scarcely to be believed how rapidly barking is performed. The little knife is first run down the stick on two opposite sides, from end to end, and then, by inserting the instrument at the thick part, between the bark and the stick, and running it quickly along, with a twisting motion, the long slip of fine bark falls off without a slit or blemish, an object very desirable if the quality be in other respects fine. When the sticks are all striped they are of no further use.

On the morning of the second day the wives and children of the peelers flock to the peeling-house; and seated in rows, commence scraping off the green cuticle from the heaps of bark slips, which are brought to them by the younger children, who also remove the scraped spice to the men. These begin by assorting them into three qualities, according to thinness of bark and brightness of color; the shorter pieces of each kind are set aside, to be placed in the interior of the pipe, while the longest are placed outside. The piping, or quilling, then commences, and by dexterous management, the peeler so selects his bark, that very little cutting at the ends is required to form them into their proper length. The quills are made into uniform lengths of three feet and a half, and three layers of the bark, or quill, inside each other. The greatest vigilance of the superintendant and his native assistants, is needed in this stage of the process; for much of the value of the spice depends upon the proper divisions into qualities, and, not less, upon the rejection of very coarse pieces; for it is to the interest of the peelers—who are paid by the weight—that as much as possible of the thick be placed in the quills; but the master's interest requires that as little as possible should be so hidden.

The bark having a natural tendency to curl up, requires but little rolling; and when made upon the second day, the pipes are laid out singly upon cords stretched across the upper part of the building. There they remain for two days, when they undergo a little more rolling up, or "handling," and are placed on stands outside, exposed to the action of the hot air, but carefully sheltered by cocoanut leaves from the rays of the sun.

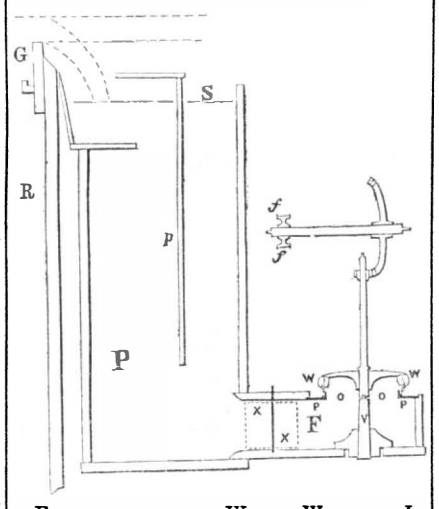
Three or four days of this open-air drying will generally suffice. The pipes are then piled upon light stands of wood for a week or two, when they are paid for. Each party of "Chalias" keep their cuttings separate; and a good deal of emulation often rises amongst them as to who shall turn out the greatest quantity of the finest kind, called "first sort."

For the Scientific American.

Hydraulics.

(Continued from page 264.)

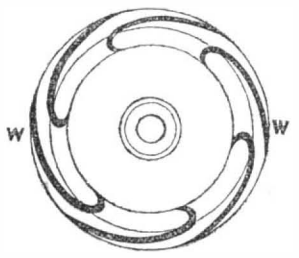
Fig. 47.



Experiments with Water Wheels.—In 1844, a number of experiments were made by Z. Parker, of Ohio, upon wheels of various forms, and especially to test the advantage of introducing the water to the wheel with a circular motion in the direction of the motion of the wheel. We have selected two views from these experiments, one (fig. 47) is a vertical section of wheel, reservoir, and draught box; R is the reservoir; G is the guage; P is the penstock; F the flume conducting the water to the wheel; W is the wheel; O is a cylinder opening into the wheel; V is a pivot; X X are guides in the flume to direct the water to the right or left; *p* is a partition in the penstock to prevent agitation at the surface, S; there is a cast-iron plate, covering the end of the flume, through which are openings to the wheel; *f* is a friction pulley for a dynometer.

Fig. 48 is a section of the improved wheel, W W, across the axis, showing the forms of the curves and apertures. The wheels were of a fair size to test the qualities of the same, as a sufficient data for practical working in large works. The wheel represented was made of iron, and of good workmanship. The experiments were conducted with much care, and repeated and re-repeated with nearly uniform results. The power was measured by "Prony's Friction Brake," placed on a horizontal shaft propelled with bevel gearing by the vertical shaft of the wheel. The intensity of the force of the friction was measured by a hydrostatic balance, with a scale of weight measure, by which the variation of the 50th part of a pound was instantly detected. The water was drawn from a deep quiet reservoir over an open space gauge of 4 inches deep, and the discharge was proportioned to the length of the notch opened. The discharge was estimated by the formula Q=0·385, discharge per minute of cubic feet, ×D, depth of gauge notch in inches, ×L, length of gauge notch in inches. The head of water was 2,694 feet=32½ inches, counting the vertical height of the surface above the middle of the discharging apertures of the wheel.

Fig. 48.



This wheel, fig. 48, was 10 inches in diameter, had six discharging apertures of 9 square inches aggregate transverse section. The water entered upward though a concentric cylindrical opening, 9½ inches in diameter without circular motion. When running free it made 520 revolutions, and used 54·86 cubic feet of water in one minute. When resisted so as to make 340 revolutions in one minute, the weight raised 1 foot high in one minute, was 4,148 lbs., the discharge of water was 49·08 cubic feet. This was an experiment without the water having any circular motion when entering the wheel; the next shows the difference in the same wheel by the water conducted by a helical channel giving it a circular motion, coinciding with the motion of the wheel. The gate was drawn to admit 10⅛ square inches, and the discharge was 40 cubic feet per minute without wheel. When the wheel was resisted to make 300 revolutions per minute, it discharged 30·56 cubic feet per minute and lifted 3,600 lbs. one foot high. The co-efficient of this is 699; of the former, 497, a great difference. By letting on the water to the same wheel through the helical channel, but in a contrary direction to that of the wheel, the co-efficient was only ·019, discharging 26·75 cubic feet of water in one minute. The advantage of giving the water a previous circular motion was thus set forth in a clear unequivocal manner.

Geological Explorations in North Carolina.

The Salem "People's Press" contains two communications from Mr, S. W. Dewey, giving an account of his explorations in the counties of Forsyth, Surry, and Stokes, accompanied by specimens, for the Salem Museum, of jasper, alum stone, porphyretic and quartz crystals, (or mountain diamond) iron pyrites, lead ore, limpil, or crystal jasper, (a rare gem in the mineral kingdom, and chorl or black tommaline. The range of porphyry extends, he says, nearly twenty miles through Stokes and Surry, in which range lead and silver ore have been found, particularly on the lands of Chief Justice Ruffin, where two shafts, fifty feet deep, have been sunk within six months past.

Mr. Dewey says there is a most excellent mineral spring in the midst of this interesting region at the foot of Steel's mountain, in Stokes, at a place commanding a fine view of the whole chain of the Sauratown mountains, the Pilot or Mount Ararat, and other interesting points, the sight of which would well repay the expense and trouble of half a dozen voyages across the Atlantic in our bird-like steamships.

Adulterations in Food.

The London Lancet has done the British public some service by pointing out the adulterations in flour and other things used for domestic purposes. About mustard it says, 'out of 42 samples purchased indiscriminately, the whole were adulterated with immense quantities of wheaten flour, highly colored with turmeric, the specimens in tinfoil packages, and labelled "Fine Durham mustard," or "double superfine," containing with the exception of much husk, scarcely anything else. In connection with bread and flour, the conclusions arrived at were unexpected. Out of 44 samples of wheat flour (including several of French and American) purchased in all quarters of the metropolis, not a single instance was detected of admixture with any other farina, or of the presence of spurious matters of any kind. It is admitted, therefore, that millers and corn dealers are somewhat maligned. As respects bread, however, the results were not so favorable. Although its adulteration with alum is an offence liable to a penalty of £20, this material was found in every one of the samples examined, the object for which it is used being to give bad flour the white appearance of the best, and to enable the bread made from it to retain a larger proportion of water, so as to gain in weight. The number of samples was 24, and in 10 of these the quantity was very considerable.

LITERARY NOTICES.

Byrne's Mechanic's Pocket Companion.—Dewitt & Davenport, publishers, New York. This is a very handsome pocket compendium for mechanics and engineers; edited by Oliver Eyrne, C. E., and published by the above firm. It is a most creditable production; in fact, we believe it is the best of the kind that has ever been published. It has three very excellent engravings of Steam Engines, viz., Locomotive, Steamboat, and Stationary, with a description of their parts. It contains a description of mechanical powers, the use of logarithms, wheelwork, how to measure superfices and solids, &c.; in fact it is full of everything useful. It has a Universal Thermometer scale at the end, which makes it exceedingly valuable to almost every person. The price is $1; it is well bound, gilt edge, and has a pocket lap. It can be had at this office.

Harper's New Monthly Magazine, for May, is a superb number, containing several beautiful illustrations of the Novelty Works, this city; besides this feature, the literary contents are of the highest order. The publishers are determined to spare no pains or expense in making it the first journal of literature extant; up to this time it has no superior.

The International Magazine, for May, contains finely execnted likenesses of Geo. Wilkins Kendall, chief editor of the New Orleans Picayune, and Nathaniel Hawthorne, author of the "Scarlet Letter," etc. Among other illustrations we notice "The Washington Monument," "Washington's Tomb," "Hogarth's House and Tomb," besides others of interest. The literary papers are of the first class. Each number of this magazine contains 144 pages and is furnished for $3 per annum. Stringer & Townsend publishers, 222 Broadway, N. Y.

The Dollar Magazine, published by E. A. & G. L. Duyckinck, 109 Nassau st., has appeared for May. It is conducted with consummate tact and should be well patronized. There are many families in this country who do not feel able to pay out $3 for a magazine, to all such we say, that "The Dollar Magazine" is just the work to meet your wants.

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Any person sending us three subscribers will be entitled to a copy of the "History of Propellers and Steam Navigation," re-published in book form—having first appeared in a series of articles published in the fifth Volume of the Scientific American. It is one of the most complete works upon the subject ever issued, and contains about ninety engravings—price 75 cents.

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